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Environmental Impact Statement NV063-EIS07-019

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MOUNT HOPE PROJECT
FINAL
ENVIRONMENTAL IMPACT STATEMENT
VOLUME II of III

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MOUNT HOPE PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT

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APPENDICES

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Appendix B: Eureka Moly LLC Tailings Siting Evaluation (32 pages)

Appendix C: Eureka Moly LLC Water Resources Monitoring Plan (19 pages)

Appendix D: Mount Hope Project Mitigation Summary Plan (12 pages)

- **Attachment 1:** Pony Express Trail Access Mitigation (4 pages)
  - Addendum A: Pony Express Trail Travel Hazard Training Checklist (3 pages)
- **Attachment 2:** Wild Horse and Wildlife Water Source Mitigation Plan (8 pages)
  - Attachment A: Whistler Mountain (NV0608), Romano Stock Well (1 page)
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  - Attachment C: Roberts Mountain (NV0607), Big Windmill (1 page)
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- **Attachment 3:** Mount Hope Greater Sage-Grouse Conservation Measures (7 pages)
- **Attachment 4:** Mitigation Strategy for protecting important roosting colonies of Townsend's big-eared bats at the Mount Hope Mine by Eureka Moly, LLC (15 pages)

Appendix E: Mount Hope Socioeconomic Supplemental Analysis (14 pages) and ECSD Data (5 pages)

Appendix F: Native American Consultation Documentation (16 pages)

Appendix G: BLM Sensitive Species List (2 pages)

Appendix H: Draft EIS Public Comments and Responses (475 pages)

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3.4 Geology and Mineral Resources

3.4.1 Regulatory Framework

The U.S. Congress established the right to access and develop mineral resources on open lands administered by the Federal Government under the 1872 General Mining Law. This law has been amended many times since its passage; however, the underlying right to access and develop minerals has remained in the General Mining Law. Limitations on the development of minerals under the General Mining Law have been established by the U.S. Congress in their passage of the various environmental laws (i.e., CWA, Clean Air Act [CAA], Endangered Species Act [ESA], etc.). The BLM has been charged by the U.S. Congress with the management of activities on public lands under the General Mining Law. The BLM implements this management through regulations at 43 CFR 3809.

The U.S. Congress has passed two laws that establish the policy for the development of mineral resources in the U.S. These acts are the MMPA and the Materials and Minerals Policy Research and Development Act of 1980. Congress declared that the national mineral policy is "...to foster and encourage private enterprise in (1) the development of economically sound and stable domestic mining, minerals, metal and mineral reclamation industries, (2) the orderly and economic development of domestic resources, reserves, and reclamation of metals and minerals to help assure satisfaction of industrial, security, and environmental needs ...". The 1980 Act reiterates these statements from the 1970 act.

The NDWR has safety requirements for water impoundment facilities of a size that are covered under the regulations at NAC 535.010 through 535.420. These regulations address how impoundments are designed, constructed, operated, and inspected.

Construction of mine facilities is regulated by standards of the Uniform Building Code (UBC). Eureka County currently uses the 2003 version of the International Building Code. The seismic zone designation throughout Eureka County is zone 3 on a scale ranging from 1 (indicating less damage expected) to 4 (indicating the most damage expected). Seismic activity in the vicinity of the Project Area is discussed under Section 3.4.2.4.10. Eureka County does not have specific regulations for building construction.

3.4.2 Affected Environment

3.4.2.1 Study Methods

The geology in the Project Area has been studied in detail by numerous geologic investigators. A comprehensive map of Eureka County was compiled in 1967 and is included in Geology and Mineral Resources of Eureka County, Nevada (Roberts et al.1967). The geology in the area has recently been researched and the structural setting reinterpreted (Crafford 2007) as part of the process of compiling a new geologic map for the entire State of Nevada. Crafford (2007) has described the various geologic units in context of sedimentary rocks and assemblages. Local, in depth studies of the Project Area have been ongoing since the deposit at Mount Hope was discovered. Current studies by EML geologists concur with the descriptions formulated by geologists formerly working at the Project. The following section describes the geology of the Project Area and the Mount Hope deposit. The geologic information in this section is summarized primarily from the paper written by Westra and Riedell (1996) and published in the

Geological Society of Nevada's 1996 Geology and Ore Deposits of the American Cordillera, Symposium Proceedings. Crafford's (2007) interpretations have been noted where appropriate.

3.4.2.2 Existing Conditions

The Project is located in the central Great Basin section of the Basin and Range Physiographic Province. Block faulting in the area has resulted in generally north south trending topography. Structural deformation has resulted in a series of valleys separated by mountain ranges.

3.4.2.3 Regional Geology

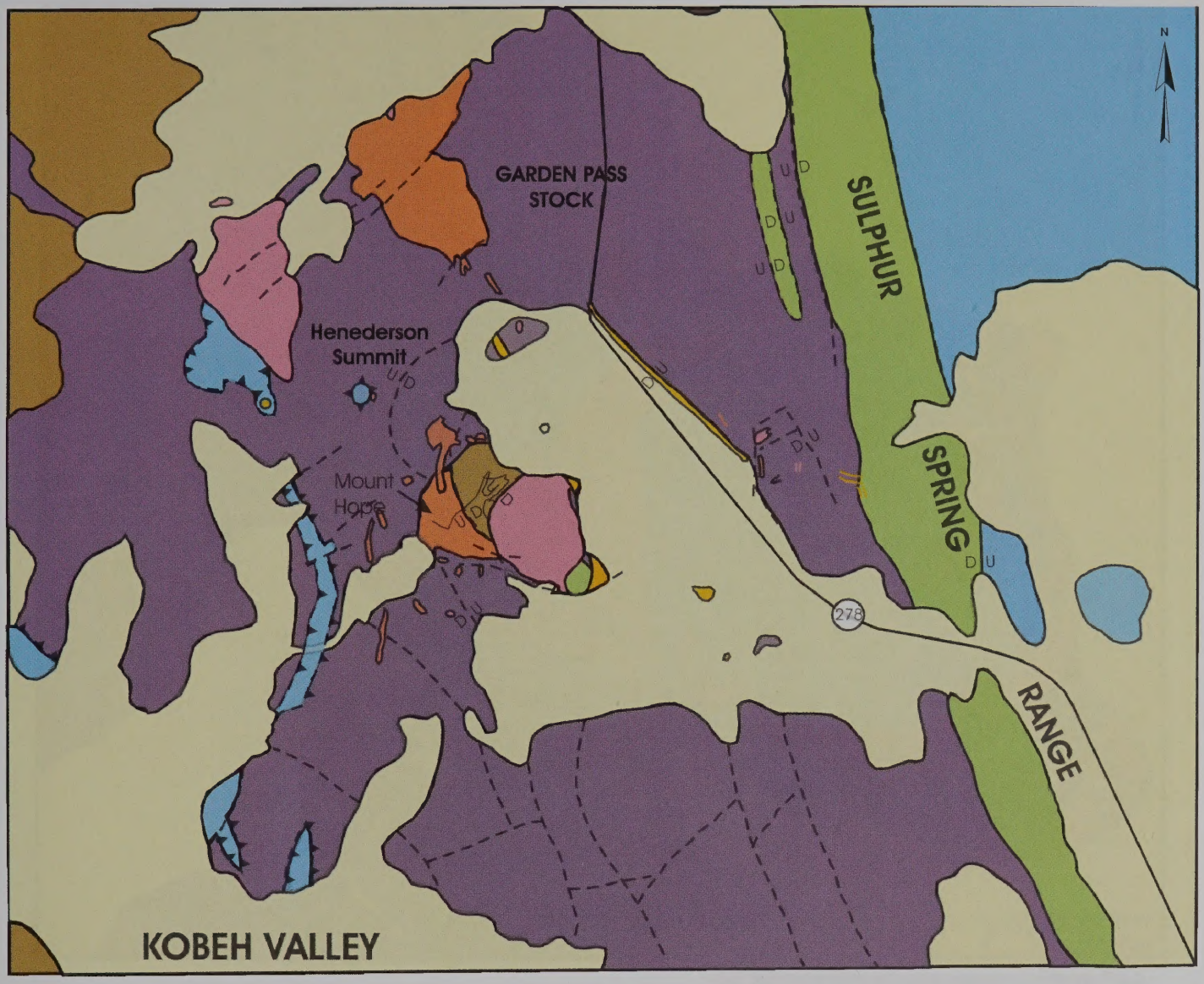
Mount Hope is situated near the leading edge of the Roberts Mountains thrust. East vergent thrusting placed a basinal sedimentary and volcanic ("Western") assemblage on top of coeval, predominantly shelf sequence carbonate rocks ("Eastern" assemblage) during the Devonian-Mississippian Antler orogeny (process of mountain building). Western assemblage mudstones, cherts, sandy limestones, sandstones, and conglomerates of the Ordovician Vinini Formation underlie most of the Project Area. Figures 3.4.1, 3.4.2, and 3.4.3 show the geology and stratigraphy of the area.

Eastern assemblage shelf sequence rocks, including the Silurian Lone Mountain Dolomite and Devonian Nevada Formation, are exposed along the eastern side of the Sulphur Spring Range. Several fault bounded exposures of dolomite and limestone of the Nevada and Devils Gate Formations lie west of Mount Hope. These have been interpreted as windows through the Roberts Mountains thrust; fault slices of lower plate material caught up in the upper plate; tectonic slides structurally interlayered with and overlying the Vinini Formation, emplaced during early Cretaceous (?)[1] gravity sliding; or lower plate blocks rotated and juxtaposed against Vinini Formation rocks by Oligocene or younger extensional faults. Previous mapping and drilling indicate that the carbonate blocks both overlie and are interleaved within the Vinini Formation, and are in turn overlain by tuffs related to the Mount Hope igneous complex. Crafford (2007) has reinterpreted and recategorized early mapped units into assemblages such as Slope Assemblage, Basin Assemblage, and others. These assemblages formed under varying circumstances and then were involved in complex structural events, which destroyed the original stratigraphic sequence making it very difficult to determine or interpret underlying and overlying strata and the age of those strata. This is a key component to the discussion of paleontology in Section 3.5.

During the Antler orogeny, an elongate foreland basin formed at the toe of the allochthon. This basin was filled with a post-orogenic coarse clastic "Overlap" assemblage representing detritus eroded off the Antler highlands. In the Mount Hope area, the Overlap assemblage is represented by Permian limestone, conglomerate, and shale of the Garden Valley Formation, exposed in the Sulphur Spring Range and at the southeastern contact of the Mount Hope igneous complex. Intermittent orogenic movement during the late Paleozoic and Mesozoic resulted in folding and thrust faulting of the Overlap assemblage and underlying formations.

The leading edge of the Roberts Mountains thrust is not exposed in the Mount Hope area; however, the distribution of Western and Eastern assemblage rocks indicates that the trace of the

[1] The use of "(?)" is a standard practices when stating uncertain geologic ages.



QUATERNARY

- Alluvium

TERTIARY

- Basalt flows
- Dacite porphyry
- Quartz porphyry
- Rhyolite ash flow tuffs and vent breccias

PERMIAN

- Garden Valley Formation - limestone, sandstone, conglomerate, shale

ORDOVICIAN TO DEVONIAN

- Miogeosynclinal Carbonates and Clastics - Includes Eureka Quartzite, Lone Mountain and Nevada Dolomites, and Devils Gate Limestone

ORDOVICIAN

- Vinini Formation - chert, siltstone, shale, limestone, quartzite

SYMBOLS

- Contact
- Normal fault, showing displacement
- Thrust fault

SOURCE: Westra and Riedell (1996) published in the Geological Society of Nevada's 1996 Geology and Ore Deposits of the American Cordillera

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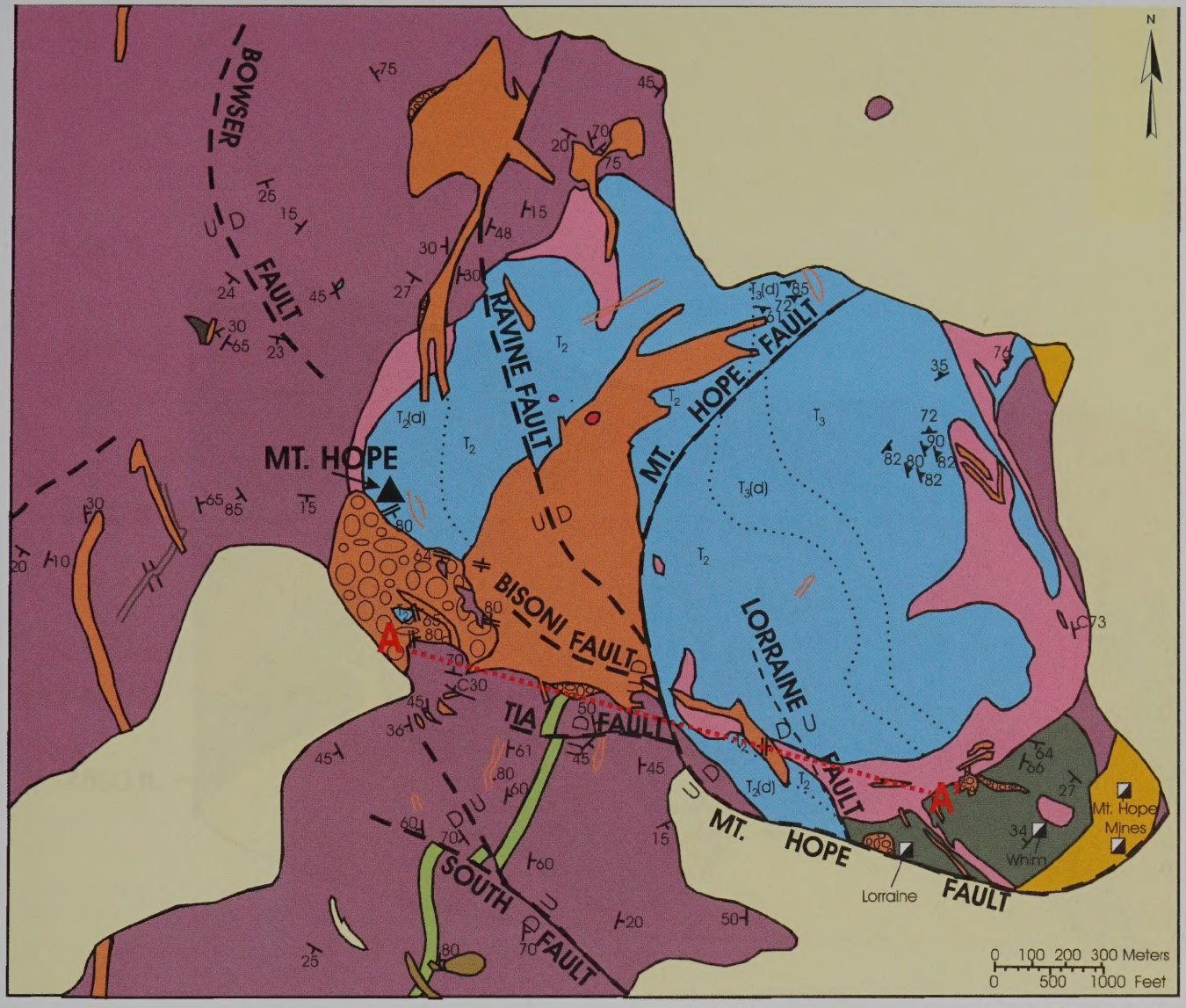
BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

General Geology of the Mount Hope Area, Nevada

Figure 3.4.1



A-A' indicates line of cross section in Figure 3.4.3.

QUATERNARY

- Alluvium

TERTIARY

- Dacite porphyry
- Quartz porphyry breccia (age uncertain)
- Quartz porphyry
  Quartz porphyry border phase
- Rhyolite vent breccia
- Quartz-eye tuff (age uncertain)
- T_3, $T_3(d)$, T_2, $T_2(d)$, T_1: Mt. Hope Tuff - cooling units designated T_1, T_2, and T_3 from oldest to youngest
  Density welded zones indicated by (d)
  T, undivided Mt. Hope Tuff
- Biotite quartz monzonite porphyry (age uncertain)

PERMIAN

- Garden Valley Formation

ORDOVICIAN

- Vinini Formation
  Chert, argillite, quartzite, minor limestone
  Limestone, with subordinate clastic sediments

SYMBOLS

- Contact: mapped, approximate, inferred, showing dip
- Contact between cooling and welding unit in tuff
- Normal fault, showing displacement
- Strike and dip of beds
- Strike and dip of eutaxitic foliation
- Strike and dip of sheeted quartz vein sheet
- Mine workings

SOURCE: Westra and Riedell (1996) published in the Geological Society of Nevada's 1996 Geology and Ore Deposits of the American Cordillera

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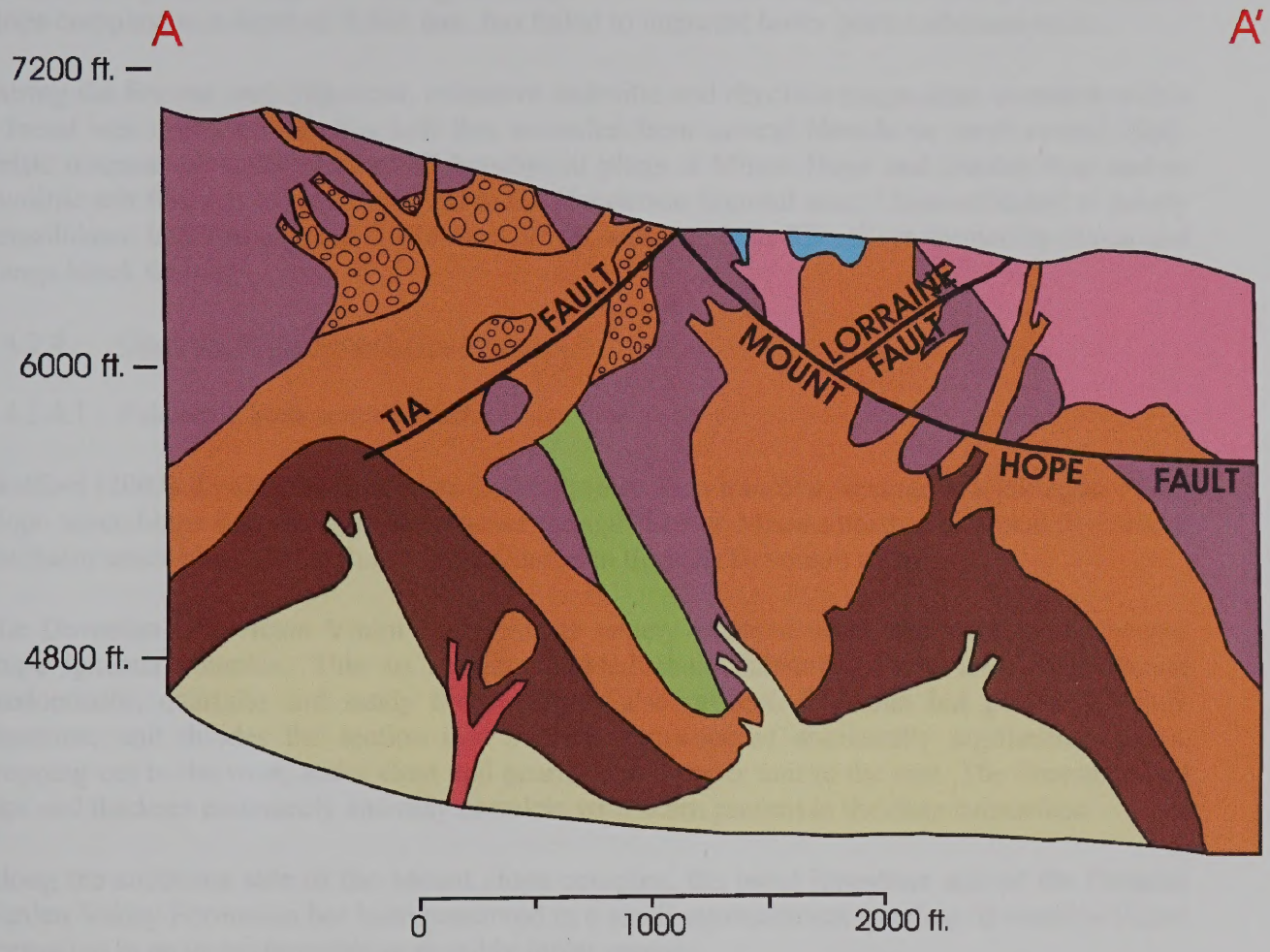
MOUNT HOPE PROJECT

DRAWING TITLE:

Geologic Map of the Mount Hope Area

Figure 3.4.2



TERTIARY

- Fine-grained granite
- Coarse-grained quartz porphyry
- Apilitic quartz porphyry
- Quartz porphyries
- Quartz porphyry border phase
- Rhyolite vent breccia
- Mount Hope Tuff

ORDOVICIAN

VININI FORMATION

- Chert, argillite, quartzite, minor limestone
- Limestone, with subordinate clastic sediments

SOURCE: Westra and Riedell (1996) published in the Geological Society of Nevada's 1996 Geology and Ore Deposits of the American Cordillera

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BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Geologic Cross Section

Figure 3.4.3

thrust is concealed beneath the Garden Valley Formation in the Sulphur Spring Range or is faulted out by the structure bounding the range to the east. Drilling in the vicinity of the Mount Hope complex, to a depth of 2,888 feet, has failed to intercept lower plate carbonate rocks.

During the Eocene and Oligocene, extensive andesitic and rhyolitic magmatism occurred within a broad east northeast trending belt that extended from central Nevada to north central Utah. Felsic magmas crystallized as small hypabyssal plugs at Mount Hope and Garden Pass and as rhyolitic ash flows at Mount Hope and in the Henderson Summit area. Unconsolidated to poorly consolidated late Tertiary and Quaternary gravel, sand, and silt fill valleys formed by Basin and Range block faulting.

3.4.2.4 Geology of the Mount Hope Area

3.4.2.4.1 Paleozoic Sedimentary Rocks

Crafford (2007) divides the rock units in the Project Area into two separate assemblages: 1) the Slope assemblage that contains Ordovician through Lower Mississippian rocks; and 2) units in the Basin assemblage that include Upper Cambrian through Devonian rocks.

The Devonian-Ordovician Vinini Formation is widely exposed south and west of the Mount Hope igneous complex. Thin to medium bedded shale, siltstone, chert, and conglomerate predominate; quartzite and sandy limestone are also present. One thin but persistent sandy limestone unit divides the section into a lower sequence of dominantly argillaceous rocks, cropping out to the west, and a chert and quartzite rich upper unit to the east. The limestone bed dips and thickens eastwardly and may correlate with skarn present in the deep subsurface.

Along the southeast side of the Mount Hope complex, the basal limestone unit of the Permian Garden Valley Formation has been preserved in a small asymmetrical syncline. It overlies Vinini Formation in an unconformable or possibly thrust contact.

3.4.2.4.2 Garden Pass Quartz Porphyry

The Garden Pass stock is located 2.5 miles north of Mount Hope and consists largely of unaltered rhyolitic quartz porphyry, similar to the main phase quartz porphyry of the Mount Hope complex.

3.4.2.4.3 The Mount Hope Igneous Complex

The Mount Hope Igneous Complex consists of rhyolitic and subordinate rhyodacitic to dacitic intrusive and extrusive phases and thus represents a subvolcanic erosion level of a mid-Tertiary eruptive center. Welded rhyolite tuffs are distinguished by the presence of shard structures and variable amounts of coarse pumice. These rocks probably formed from localized ash flows erupted from the complex. Rhyolite vent breccias are rich in lithic fragments but lack pumice and glass shards, and form steeply dipping ring dikes along the margins of the complex. Quartz porphyries occur both as autoliths in and as dikes cross cutting the rhyolite tuffs and vent breccias and must, therefore, predate and postdate the latter rock types.

Rhyolite tuffs: The most extensive ash flow unit, the informally named variably welded Mount Hope tuff, is characterized by 25 to 40 percent small angular phenocrysts, Vinini siltstone, and

pumice in a devitrified groundmass of fine crystalline quartz and K-feldspar (potassium feldspar). The texture of the tuffs contrasts with that of porphyries and pumice fragments due to the fracturing of crystals during ash flow eruption and dissipation of fine ash out of the top of the eruptive cloud, resulting in the higher phenocryst content in the tuffs.

Rhyolite vent breccias: The southeastern and northwestern contacts of the Mount Hope complex are marked by ring dikes of rhyolite vent breccia that cut all units of Mount Hope tuff. The breccias have broken crystals similar to those in the Mount Hope tuff, but contain fewer phenocrysts, larger and more abundant lithic fragments, and neither shards nor pumice. Angular fragments of early quartz porphyry and Vinini siltstone, quartzite, and hornfels are included.

Quartz porphyries: Intrusive rhyolitic quartz porphyries contain subhedral to euhedral (or rarely broken) quartz, K-feldspar, and plagioclase phenocrysts in groundmasses of allotriomorphic granular texture and varying grain size. Early quartz porphyry, presently known only from autoliths in rhyolite tuffs and vent breccias, is the only known quartz porphyry phase that predates these units. Autoliths of early quartz porphyry are most common in rhyolite vent breccia along the eastern and southeastern edges of the complex, suggesting that a mass of early quartz porphyry may occur in the subsurface in this area. No reliable macroscopic or petrographic criteria distinguish this rock type from the quartz porphyries that postdate the eruptive episode.

A minimum of four post-eruptive quartz porphyry phases together constitute an irregular intrusive mass that cuts both Mount Hope tuff and rhyolite vent breccia. From margin to core, the quartz porphyry phases become successively younger and have progressively coarser groundmasses. The discontinuous rind of the porphyry pluton, exposed primarily along the southwestern contact zone, consists of a chilled border phase. An extremely fine grained groundmass, common broken phenocrysts, and numerous xenoliths of Vinini hornfels distinguish this unit from the later porphyries. Main phase quartz porphyry, the most widespread intrusive phase at the surface, forms an irregular stock of somewhat variable texture and numerous dikes cutting the Vinini Formation.

With increasing depth, the quartz porphyry grades into or is cut by aplitic quartz porphyry characterized by distinctly coarser aplitic groundmass. Only rarely do dikes of aplitic quartz porphyry intrude overlying quartz porphyry. The core of the igneous complex consists of a heterogeneous mass of granite porphyries and coarse grained quartz porphyries. A contact breccia, with fragments of quartz porphyries and Vinini hornfels and skarn, locally separates the granite porphyry with a quartz K-feldspar oligoclase groundmass of grains. The finer grained groundmass of the coarse grained quartz porphyry in the core of the stock may be the result of pressure quenching during brecciation of the granite border zone.

Other related intrusive units are volumetrically insignificant. Fine grained granite or aplite forms rare dikes cutting all quartz porphyry phases. Small hydrothermal quartz porphyry breccias with matrices of silicified rock flour have been mapped northeast and south southeast of the summit of Mount Hope.

Intermediate rocks: Dikes of rhyodacitic to dacitic composition crop out north, east and west of the Mount Hope Complex. It is uncertain whether these rocks represent more mafic products of the Mount Hope magma chamber or different magmas altogether. Rare dikes of biotite quartz monzonite porphyry cut Vinini Formation west of the complex and are cut in turn by dikes of quartz porphyry. Dacite porphyry occurs as dikes on the lower slopes north and east of Mount

Hope and shows no crosscutting relationships with the rhyolitic units of the complex; however, this porphyry is affected by hydrothermal alteration.

Age of the Mount Hope Complex: Radiometric age dates range from 26 to 49 million years ago (Ma) and are markedly discordant for individual units. Wide spans in potassium argon and fission track dates have been reported from other porphyry Mo deposits but are now considered suspect due to probable resetting at lower temperatures. Current interpretation of these data, with consideration given to differences in the quality of samples is that the age of all the rhyolitic units is about 38 Ma based on clustering of ages in the 36 to 40 Ma range. Dacite porphyries exhibit peripheral alteration and mineralization consistent with their spatial position in the system but yield anomalously younger 30 to 33 Ma ages. Based on geologic relationships, it is inferred that the dacite porphyry is approximately the same age as the rhyolitic rocks.

3.4.2.4.4 Structural Development During the Emplacement of Mount Hope Igneous Complex

The thickness and distribution of the Mount Hope tuff in the subsurface and the highly variable and locally steep dips of eutaxitic foliation suggest that ash flow eruptions were accomplished by cauldron subsidence. The actual cauldron bounding structures have not been observed either in outcrop or drill core because they were largely to completely filled with rhyolite vent breccia. Subsidence is inferred, however, because the ring dikes of rhyolite vent breccia juxtapose outcropping Paleozoic sedimentary rocks on their outer sides against substantial thicknesses of Mount Hope tuff overlying downdropped Paleozoic rocks on their inner sides. Map patterns of rhyolite vent breccia suggest two cauldrons formed.

The western cauldron, approximately 3,300 feet in diameter, is outlined by the partial ring dike northwest and north northeast of the summit of Mount Hope. This ring fracture system juxtaposes a 1,000-foot thick section of the lower cooling unit of the Mount Hope tuff against Vinini Formation. The restricted distribution of this cooling unit indicates that eruption and accumulation were almost entirely confined to this small western cauldron.

The ring dike of rhyolite vent breccia that borders the complex on the eastern side was emplaced along a structure that juxtaposed the middle and upper cooling units against Paleozoic rocks to the east and south. The ring dike partially outlines a cauldron approximately 900 feet across, comprising the eastern half of the complex. Both middle and upper tuff units ponded in, and probably erupted from, this eastern cauldron. At least 1,150 feet of subsidence is inferred. The outflow facies of the middle cooling unit has been preserved in the Henderson Summit area and in widely scattered small erosional remnants. The Bowser fault, northwest of Mount Hope, forms a broad semi-circular structure that may define a yet larger subsidence area.

3.4.2.4.5 Postmineral Structures

Several fault zones can be traced between drill holes in the subsurface. Offsets in zones of alteration and mineralization indicate that significant postmineral normal movement took place along these structures. Locally strong pyrite and molybdenite mineralization within these zones may provide evidence for some premineral history. Two sets of faults occur: 1) high angle structures trending west northwest and 2) moderate to high angle ring shaped structures that truncate the earlier set.

The west northwest trending Bisoni and Tia faults cut the southwestern edge of the complex and adjacent Vinini Formation. The faults dip 60 to 70° in a northerly direction. The Mount Hope fault terminates these structures to the east. Offsets of Mo zones along these faults suggest postmineral movement of less than 330 feet.

The Mount Hope fault has been well defined by drilling and is a listric fault with easterly dips of 55° at the surface and 30 to 35° at depth. In plain view, the fault is spoon shaped, opening to the northeast, which suggests that displacement was in a north 65° east direction. Normal movement estimated at 650 to 800 feet placed argillic alteration on top of better grade Mo mineralization in the footwall.

The Lorraine fault appears to dip southwesterly at a moderate angle. It is restricted to the hanging wall of, and may be an antithetic normal fault related to, the Mount Hope Fault. The listric Ravine fault only occurs in the footwall of the Mount Hope fault. The Ravine fault is nearly vertical at the surface, but flattens with increasing depth to a moderate easterly dip.

Map patterns suggest that cooling units of the Mount Hope tuff dip gently northeast, although attitudes of compaction foliation are far less regular. Miocene basalts exposed in the Roberts Mountains also dip gently east suggesting that Basin and Range block faulting tilted the Mount Hope area between ten and 20° east following mineralization.

3.4.2.4.6 Alteration and Minor Element Distribution

Hydrothermal alteration and mineralization affect nearly all of the Mount Hope complex and a wide area of adjacent sedimentary rocks. Patterns of alteration and metal zoning are well developed. Mapping and petrographic study allow correlation of alteration effects in igneous rocks with those in the Vinini Formation. Regardless of host, such effects are classified into weak argillic propylitic, argillic, potassic phyllic, potassic, high silica, and biotite alteration zones, arranged from periphery to core of the hydrothermal system.

Weak Argillic Propylitic Alteration: Weak argillic and propylitic assemblages characterize the outermost zone of the Mount Hope hydrothermal system. In quartz porphyry, plagioclase is partly replaced by kaolinite and sericite. The more calcium rich dacite porphyry commonly exhibits propylitic assemblages, with aggregates of epidote, carbonates, and clays replacing plagioclase. Thermal metamorphism of Vinini argillites extends up to 2,000 feet from the contact with the Mount Hope complex and produced hornfels with blocky fracturing but no megascopic mineral changes. Local structurally controlled argillized zones, with carbonates, chlorite, and sulfides, extend outward into unaltered Vinini siltstones and shales.

Argillic Alteration: Argillic assemblages are widespread and especially well developed in Mount Hope tuff and rhyolite vent breccia in the hanging wall of the Mount Hope fault. Montmorillonite, kaolinite, mixed layer illite/montmorillonite, and minor calcite and sericite/illite completely replace plagioclase. K-feldspar is fresh to weakly "dusted" by clays and sericite. Vinini hornfels within the argillic zone contains quartz, sericite and disseminated pyrite. Closer to the center of the hydrothermal system, but still within the argillic zone, hydrothermal or contact metamorphic biotite imparts a distinctive chocolate brown color to the hornfels. Minor amounts of pyrite or pyrrhotite are present. Limestone of the Garden Valley Formation formed marble with isolated pods and lenses of skarn containing garnet, pyroxene, tremolite, epidote, fluorite, and retrograde clays, carbonates, chlorite, and biotite. Silicate veins are rare to absent in

most rock types, although sparse hairline quartz veinlets cut more competent rocks such as the densely welded tuffs. Disseminated grains and thin veinlets of pyrite increase with depth. Discontinuous veinlets containing sphalerite, pyrrhotite, or rarely galena are also common.

Low Mo (less than 20 parts per million [ppm]) and F (less than 500 ppm) values characterize the argillic zone. Highly anomalous Pb, Zn, Ag, and Mn form distinct haloes largely within the argillic zone, above and peripheral to molybdenite ore. In cross section, anomalous Pb and Ag values occur above and outside a strongly developed Zn and Mn halo. The historic Mount Hope mine exploited the high grade Zn-rich mineralization formed where this halo intersected reactive limestones of the Garden Valley Formation. Intense orbicular alteration and the highest total sulfide concentrations generally overlap with strong Zn mineralization. Cu and Sn values increase with depth in the argillic zone, but commonly peak in the underlying potassic phyllic zone.

Potassic Phyllic Alteration: Early potassic alteration with overprinted sericite forms a discontinuous zone between the potassic core and the peripheral argillic zone. This region, termed the potassic phyllic zone, is best developed in quartz porphyries and Vinini hornfels along the southern and southwestern sides of the complex. Throughout the exposed potassic phyllic zone, quartz veinlets commonly occur in near vertical sheeted sets that appear to form radial and annular patterns centered on the exposed potassic core. The potassic phyllic zone averages only one to two weight percent sulfides, mostly pyrite and molybdenite, with pyrrhotite also present in Vinini hornfels.

A rapid increase in Mo content takes place within the potassic phyllic zone. No more than 500 to 650 feet separate the 0.01 percent and the 0.1 percent Mo contours in most drill holes. Chalcopyrite bearing veinlets are also common in this zone and, where exposed to weathering, may give rise to a zone of weak chalcocite enrichment. Sn is commonly found in high concentrations. The highest F values straddle the transition between potassic phyllic and underlying potassic alteration, directly above the Mo ore zone. Fluorite occurs in veinlets and in xenomorphic aggregates replacing the porphyry groundmass and some K-feldspar phenocrysts. No topaz has yet been recognized. F is preferentially concentrated in sedimentary rocks of the Vinini Formation, and a very strong surface F anomaly occurs along the contact with the main quartz porphyry phase.

Potassic Alteration: A zone of potassic alteration represents the exposed core of the hydrothermal system and widens considerably with depth, extending easterly in the footwall of the Mount Hope fault. Potassic altered quartz porphyries consist largely of quartz, K-feldspar, and minor fluorite, and show a striking enrichment in potassium. Hydrothermal K-feldspar replaces plagioclase and floods in the groundmass. Green to yellow sericite and kaolinite, in turn, replace relict and some K-feldspathized plagioclase. Fluorite locally replaces groundmass grains and K-feldspar phenocrysts. Recrystallization of argillite formed brown hornfels containing quartz, biotite, K-feldspar, plagioclase, and minor sericite. Calcareous sedimentary rocks formed skarns containing garnet, diopside, and retrograde actinolite, hornblende, chlorite, and biotite. Some quartz veins in the calcareous rocks have envelopes of hydrothermal K-feldspar which postdate formation of the garnet skarn.

A well developed stockwork of quartz ± fluorite ± K-feldspar ± molybdenite veinlets cuts quartz porphyries and Vinini hornfels and is largely confined to the potassic zone. Vein density ranges from four to 30 volume percent of the rock. In the Vinini Formation, K-feldspar is more common

in veinlets, and haloes of dark brown biotite or pale tan grey K-feldspar surround the quartz veins. Parallel vein walls, dilation of earlier structures, and offsets of earlier by later veins all indicate that open fracture filling was the dominant mechanism of vein formation. The potassic zone averages less than one percent pyrite plus molybdenite, and outcrops contain only sparse limonites.

Potassic alteration is approximately coextensive with the surface Mo anomaly and with ore grade Mo mineralization at depth. Anomalous **W** concentrations commonly occur within the deeper part of the potassic zone. The highest **W** values occur in biotite and calc-silicate hornfels of the Vinini Formation with scheelite being the dominant W mineral.

High Silica Alteration: A gradual increase in barren granular hydrothermal silica with depth marks the transition into zones of high silica alteration. In igneous rocks, high silica zones contain in excess of 30 volume percent hydrothermal quartz in veins and irregular replacements. Locally, massive silica has obliterated all igneous textures. In addition to quartz, these high silica zones contain minor carbonates, chlorite, and pyrite, but fluorite is conspicuously absent. Quartz produced by silica flooding is coarser grained than quartz occurring in stockwork veins. Petrographic study suggests that silica flooding began with suturing of strained quartz phenocrysts, forming mosaics that grew outward and coalesced into patches of granular silica. In Vinini hornfels, vein quartz increases only slightly in the high silica zone, but veinlets are less regular and nebulous patches of silica flooding are more common than in the overlying potassic zone.

Patches of silica flooding consistently appear to cut quartz molybdenite ± fluorite veinlets in drill core, in some instances assimilating remnants of mineralized fractures as "ghost" molybdenite. Such relationships suggest that silicic alteration formed somewhat later than the bulk of molybdenite mineralization.

A slight increase in pyrite content accompanies the transition from potassic to high silica alteration. Magnetite, absent from higher levels of the system, averages up to 0.5 weight percent in veinlets with quartz, biotite, chlorite, and pyrite. Traces of arsenopyrite and hematite have been noted, and Pb and Zn are locally anomalous. A significant increase in sericite, kaolinite, and calcite after relict feldspars occurs 160 to 330 feet below the top of the high silica zone and overlaps into the underlying biotite zone.

Biotite Alteration: A zone characterized by magmatic and hydrothermal biotite occurs in the subsurface in granite porphyry and coarse grained quartz porphyry. Aggregates of hydrothermal biotite with retrograde chlorite and sericite occupy magmatic biotite sites. Primary biotite and oligoclase become more abundant with increasing depth. Widely spaced high angle quartz calcite veins are common. A thin zone of low-grade Mo and W mineralization generally occurs near the top of the biotite zone.

3.4.2.4.7 Nature and Habit of Molybdenite Mineralization

Molybdenite mineralization at Mount Hope occurs in a stockwork of fractures and veinlets. Disseminated molybdenite, although present, is very rare. The bulk of mineralization occurs in four types of veinlets: 1) quartz molybdenite veinlets (comprising 75 percent of ore) range from 0.1 to five millimeters (mm) in thickness and generally contain molybdenite crystals averaging one mm in the longest dimension; 2) coarse quartz molybdenite veins (ten percent of ore) are

five to 20 mm thick and are lined with rich clusters of molybdenite crystals averaging 0.08 mm across. Such veins are most common in Vinini Formation; 3) blue quartz veins (ten percent of ore) are three to ten mm thick and bluish gray in color, imparted by sparse grains of molybdenite averaging 0.05 mm across. These veins are most common in the deeper part of the system; and 4) molybdenite "paint" (five percent of ore) refers to thin films of molybdenite, commonly smeared and slickensided, on fractures devoid of quartz.

3.4.2.4.8 Vein Paragenesis

The age relations between various vein types at Mount Hope are complex. Detailed core logging and petrographic studies suggest the following generalized sequence: 1) early barren quartz ± K-feldspar ± fluorite veins; 2) quartz fluorite molybdenite ± K-feldspar veins; 3) quartz molybdenite ± fluorite veins; 4) blue quartz veins; 5) granular silica associated with the formation of high silica zones; 6) quartz sericite pyrite ± chlorite ± fluorite veinlets (shallow); quartz pyrite ± magnetite ± biotite ± chlorite veinlets (deep); 7) molybdenite "paint" on fractures; and 8) late fractures lined with pyrite, clay or carbonate. Pervasive early potassic alteration affected all quartz porphyries, hornfels of the Vinini Formation, and possibly Mount Hope tuff. Related vein types 1 and 2 cut potassic altered porphyries and Vinini Formation but are rare in the tuffs. Molybdenite bearing quartz veins, types 2 through 4, formed during the transition from potassic to high silica alteration. These veins appear to become thicker and leaner in molybdenite with time and increasing depth, and culminate in the patches of barren granular quartz comprising the high silica assemblage. Weakly developed phyllic alteration, represented by vein type 6, cut potassic and high silica alteration. Argillic alteration may by superimposed on potassic altered Mount Hope tuff and extends well beyond the earlier potassic zone.

3.4.2.4.9 Local Geologic Structures

Three Quaternary age faults have been mapped within ten miles of the Project Area. There is a discontinuous and vaguely defined group of faults that extend southeast from approximately four miles west of Mount Hope to three miles northwest of Mount Whistler, on the southeastern flank of the Roberts Mountains. These are short faults where bedrock is found against Quaternary pediment slope deposits (Lidke 2000). There is evidence along the zone for at least one faulting event that is no older than early Pleistocene in age.

Another group of faults strikes north and is located in the Garden Valley area immediately north of the Project Area. These faults trend north and appear to down drop Quaternary deposits of the Garden Valley against Paleozoic and Tertiary bedrock of the Roberts Mountains and Sulphur Springs Range, which border the western and eastern flank of the valley, respectively (Lidke 2000). There is evidence for Quaternary movement along these faults, but no estimates of offset amounts for these faults have been reported.

Approximately ten miles southwest of Mount Hope is a northwest striking fault that follows the southwestern flank of the Roberts Mountains. It is a major range front fault that appears to extend farther southeast as a prominent scarp on pediment slope deposits of the northern part of the Kobeh Valley (Lidke 2000). Along the southwestern flank of the Roberts Mountains, the fault has a down to the southwest stratigraphic offset that juxtaposes Paleozoic bedrock against Quaternary pediment slope deposits (Lidke 2000). Evidence of latest movement is Holocene in age.

None of these faults have been studied in detail and very little is known about their nature, character and movement history, and there is no record of recent movement along these faults.

3.4.2.4.10 Seismicity

Although the Project is in a seismically active region of the country, it is not located within Nevada's major seismic belts. A search of the UNR Seismological Laboratory database revealed that from 1872 to 2008, there have been 364 recorded earthquakes greater than 3.0 within 100 miles of the site; 40 recorded earthquakes greater than 3.0 within 50 miles of the site, and zero recorded earthquakes greater than 3.0 within ten miles of the Project Area. Most of the earthquake activity in the last 156 years has been 100 miles west of the Project Area.

Table 3.4-1 indicates that 89 percent of the earthquakes within 100 miles of the site and 98 percent of the earthquakes within 50 miles of the site have been below 5.0 in magnitude. The highest magnitude earthquakes were 7.2 and 7.8 and were located approximately 100 miles southwest and 90 miles northwest, respectively. The highest magnitude earthquake (5.5) closest to the Project Area, was recorded on April 2, 1875, approximately 26 miles to the southeast. There have been no earthquakes recorded with a magnitude greater than 3.5 within ten miles of the proposed site since record keeping began in 1852.

Table 3.4-1: Seismic Events (>3.0) Recorded Near the Project Area Between 1872 and 2008

Local Magnitude	Number within 100 Miles	Number within 50 Miles	Number within 10 miles
>7.0	2	0	0
6.0 - 6.9	3	0	0
5.0 - 5.9	36	1	0
4.0 - 4.9	207	19	0
3.0 - 3.9	116	20	0

Assessment of the seismic hazards at Mount Hope was conducted using seismic models available from the USGS. One assessment tool models the occurrence of a seismic event within a 30 mile radius of the site within the next 50 years. Another calculates the peak acceleration caused by a seismic event in the next 50 years.

The USGS model indicated that the probability of a magnitude 5.0 quake occurring within 30 miles of the site in the next 50 years is between 0.4 and 0.5. The probability of a magnitude 6.0 quake occurring within 30 miles of the site in the next 50 years is between 0.10 and 0.15. The probability of an earthquake greater than a 7.0 occurring within 30 miles of the site in the next 50 years is between 0.005 and 0.01. The probability of an earthquake greater than 8.0 occurring within 30 miles of the area in the next 50 years is essentially zero.

In order to evaluate the force on a building during an earthquake, peak acceleration can be calculated for an area. During an earthquake ground acceleration varies with time. Peak acceleration can be calculated with a two percent and ten percent probability of exceedance in 50 years. An exceedance of two percent was used because it is the most conservative amount. The analysis was completed so that there is a two percent chance that the ground acceleration would be exceeded in a 50 year time period. For the Project, the percentage is calculated between 20 and 30 percent. A percentage of 20 to 30 percent calculated for the Project Area indicates that

if there is an earthquake within the next 50 years, then it would result in negligible damage to buildings of good design and construction.

3.4.2.4.11 Mineral Resources

The Mount Hope deposit is a classic Mo porphyry, similar in type to the Climax deposit in Colorado. This type of deposit has well zoned molybdenite mineralization where many intersecting small veins of molybdenite form a stockwork in an altered quartz monzonite porphyry. Similar to other porphyry-type ore deposits, the ore is low-grade but the ore body is very large. EML is focused on the economic Mo mineralization in the deposit; however, based on drilling results and the presence of other mineralization in the district such as W, Ag, gold (Au), Pb, Zn, and Cu that are present in the pit walls adjacent to and distal from the open pit, EML would evaluate these additional mineral resources in the future (**Independent Mining Consultants** [IMC] 2005). The Mount Hope deposit contains a nearly 1.0 billion ton molybdenite ore body that would produce approximately 1.1 billion pounds of recoverable Mo during its 44-year lifetime. **Approximately** 2.7 billion tons of ore and waste rock would be excavated from the open pit with an ore to waste ratio of 1:1.6. A single open pit would result from the phased mining. The ultimate pit depth would be approximately 2,600 feet **bgs** at an elevation of approximately 4,700 feet amsl.

Exxon in 1988, in one of their last diamond drill holes, encountered significant widths of good grade Zn mineralization. The drill hole encountered two zones: one zone from 128 to 272 feet in depth, 144 feet assayed 9.1 percent Zn; and one zone from 423 to 472 feed in depth, 49 feet assayed 9.3 percent Zn. Recent analyses determined that the mineralization represents a skarn zone between sediments and quartz porphyry. The mineralization in this hole is approximately 300 feet north and generally along trend of the Zn mineralization in the original Mount Hope underground Zn mine. As long as a mile of strike length remains open and unexplored. The zone is outside the limits of the planned Mo open pit. The original underground workings developed a high-grade Zn zone; however, there was no follow up to determine the full extent of the deposit after the Mo deposit was discovered in 1978.

3.4.3 Environmental Consequences and Mitigation Measures

Major issues related to geology and minerals include the following: a) geologic hazards created or magnified by Project development; b) failure of, or damage to, critical facilities caused by seismically induced ground shaking; and c) exclusion of future mineral resource availability caused by the placement of facilities (tailings or waste rock storage areas, etc.).

3.4.3.1 Significance Criteria

Adverse impacts to geology and minerals would be significant if the proposed action or alternatives resulted in any of the following:

- Impacts to the facility site or design caused by geologic hazards, including landslides and catastrophic slope failures or ground subsidence;
- Structural damage or failure of a facility caused by seismic loading from earthquakes; or
- Restriction on the current or future extraction of known mineral resources.

3.4.3.2 Assessment Methodology

Impacts of the Proposed Action and Project Alternatives were assessed based on review of reports prepared in support of the Project, review of the Project baseline characterization reports (SRK 2006), review of the Plan for the Project (EML 2006), and review of the Proposed Action. The significance of the impacts was evaluated based on the significance criteria listed above. Stability analysis of the Project waste rock dumps was analyzed in the Waste Rock Disposal and Low Grade Ore Storage Facilities Design Report (SWC 2008a). Stability analyses for the Project storage and tailings facilities are included in the South and North Tailings Storage Facilities Located in Kobeh Valley Design Report (SWC 2008b).

Waste Rock Disposal Facilities

Slope stability analyses for the WRDFs were conducted in support of the permitting level design. These analyses required the selection of strength parameters from the geotechnical work performed to date and from experience on projects similar to the Project. The slope stability analyses examined the stability of the proposed WRDFs and the LGO Stockpile under both static and seismic loading conditions.

Slope stability analyses were completed for five cross sections developed from ultimate facility configurations under the Proposed Action. Detailed information can be found in SWC's reports (2008a and 2008b), which can be viewed during normal office hours at the MLFO. For this study, all stability analyses were conducted using SLIDE V5.0 (RocScience 2007), which analyzes the stability of slopes using the limit equilibrium method. The limit equilibrium method of analysis used to find the critical circular and wedge type failure surfaces was the Spencer Method. The Spencer Method satisfies both moment and force equilibrium. The program automatically iterates through a variety of potential failure surfaces, calculates the safety factor for static and pseudostatic conditions for each surface according to Spencer's Method, and selects the surface with the minimum factor of safety commonly referred to as the critical failure surface. Specific input requirements of the SLIDE program include geometric profiles, material properties (moist unit weight, saturated unit weight, effective cohesion, and effective friction angle) and a phreatic surface profile.

Stability analyses were conducted under both static and seismic loading conditions. An earthquake event having a 1,100-year return period with a four percent probability of exceedance occurring during the 45-year operation life is considered appropriate for design of the waste rock facilities at Mount Hope. Peak horizontal ground accelerations (PHGA) were determined to be 0.15 gravity (g) and 0.23g for firm rock (Sb) and soil (Sc) respectively. For slope stability analyses, a design horizontal ground acceleration equal to two thirds of the PHGA is considered conservative for deep rotational failures (Hynes and Franklin 1984); therefore, a value of 0.15g was conservatively selected for analyzing WRDFs and the LGO Stockpile both on firm rock and soil. The complete hazard analysis is described in detail in SWC (2008b).

Strength parameters were established based on laboratory testing to date and SWC's experience with similar projects. The waste rock materials contained within all three facilities were considered to be predominantly comprised of competent, relatively durable rock based on comparatively shallow overburden depths of soil overlying bedrock within the ultimate pit limit. Results of the slope stability analyses performed on the waste rock facilities and LGO Stockpile are presented in Table 3.4-2.

Stability analyses were completed for the South TSF at the ultimate crest elevation of 6,710 feet and at the mid-life crest elevation of 6,525 feet under both static and seismic loading conditions. Since the TSF is sited in a somewhat remote area, the tailings embankment was classified as a "large dam significant hazard" in accordance with Nevada Dam Safety Guidelines. Under this classification, a dam is considered a significant hazard if its failure carries a low potential for loss of life but could cause an appreciable economic loss.

Table 3.4-2: Summary of Stability Analyses Results for the Waste Rock Disposal Facilities and the Low-Grade Ore Stockpile

Location	Section	Static Factor of Safety (Circular/Wedge)	Pseudostatic Factor of Safety (Circular/Wedge)
Non-PAG WRDF	1	2.0/2.0	1.3/1.3
	2	2.0/2.0	1.3/1.3
PAG WRDF	3	2.0/2.0	1.3/1.4
	4	2.0/2.1	1.4/1.4
Low-Grade Ore Stockpile	5	1.7/1.7	1.2/1.2

Tailings Storage Facilities

Similar to the WRDF analyses, the TSFs were analyzed using SLIDE V5.0 (RocScience 2007) using the Spencer Method. Static analyses were conducted with no applied horizontal forces, while pseudostatic analyses modeled design seismic conditions by incorporating a constant horizontal force. The embankment section selected for analysis is composed of foundation soil, cycloned sand, slimes, rockfill (toe drain), starter dam material, and smooth and textured LLDPE geomembrane liner. The material properties used for the slope stability analysis were established based on the geotechnical investigation and laboratory testing performed to date, from work completed on other projects similar in nature, area specific experience, and published data from previous studies. The nonlinear shear strength envelope was determined from Shear Interface Testing (SWC 2008b).

The distribution of head and predicted phreatic level within the facility were modeled using a finite element method seepage model embedded within the SLIDE V5.0 program. The facility cross section was modeled under steady state conditions with the probable maximum flood pond level. The phreatic surface model is considered a worst case scenario where the underdrain system is not functional, and the operating pool is at the permitted maximum freeboard level. The modeled phreatic surface is considered to be conservative because it is anticipated that the underdrain system would function as designed and the cycloned sand embankment would remain unsaturated. In addition, the supernatant reclaim pond would be maintained a considerable distance from the crest of the TSF; however, at a minimum, the reclaim pond should be maintained 1,500 feet from the TSF crest during extreme flood conditions. The TSF cross section was modeled as having a uniform conductivity in all directions (isotropic) for all material types. The hydraulic conductivities for the materials overlying the geomembrane liner were selected from laboratory data and experience with similar material on other projects. Hydraulic conductivities used in the finite element model are summarized in SWC (2008b). Results of the stability analyses for the cross sections under consideration are shown in Table 3.4-3.

Table 3.4-3: Results of Slope Stability Analyses for the Tailings Storage Facilities

Section	Type of Failure Modeled	Static Factor of Safety
Ultimate TSF	Circular	2.2
	Block	1.5
18-year (mid-life) TSF	Circular	2.0
	Block	1.5

3.4.3.3 Proposed Action

3.4.3.3.1 Mineral Resources

Direct impacts of the Proposed Action on geologic and mineral resources would result in excavation of **approximately** 2.7 billion tons of ore and waste rock from the open pit with an ore to waste ratio of 1:1.6. This equates to 1.0 billion tons of ore that would be processed. A total of 1.1 billion pounds of Mo would be shipped off site and the remainder of the material would be sent to the two tailings facilities. A total of 1.7 billion tons of waste rock would be stored in WRDFs immediately adjacent to the open pit.

The placement of the WRDFs immediately adjacent to the open pit could limit the future development of mineral resources located in the pit walls adjacent to the open pit, should those potential mineral resources be amenable to development through open pit mining methods; however, there is not sufficient reasonably available geologic and resource information to more definitively address this potential impact.

- **Impact 3.4.3.3-1:** Implementation of the Proposed Action would result in resource extraction and production of 1.1 billion pounds of Mo.

  Significance of the Impact: This is not considered a potentially significant impact to geology and minerals. However, the impact is economically significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.4.3.3-2:** Implementation of the Proposed Action would result in the extraction of waste rock that would be placed adjacent to the open pit and limit the future development of the identified Zn mineralization located to the north of the open pit.

  Significance of the Impact: This is not considered a potentially significant impact to geology and minerals, because a known Zn mineralization has not been sufficiently defined and potentially could be developed using underground mining techniques.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.4.3.3.2 Geological Hazards

The USGS model indicated that the probability of a magnitude 5.0 quake occurring within 30 miles of the site in the next 50 years is between 0.4 and 0.5. The probability of a magnitude

6.0 quake occurring within 30 miles of the site in the next 50 years is between 0.10 and 0.15. The probability of an earthquake greater than a 7.0 occurring within 30 miles of the site in the next 50 years is between 0.005 and 0.01. The probability of an earthquake greater than 8.0 occurring within 30 miles of the area in the next 50 years is essentially zero.

Seismic events could result in slope failures or structural damage to mine facilities due to an earthquake event having a 1,100-year return period with a four percent probability of exceedance during the operational life of the Project. Based on the results from SWC's analyses (2008a), which indicate a safety factor of 1.7 to 2.0, the WRDFs and Low-Grade Ore Stockpile are stable for all conditions analyzed.

For a water impoundment facility, which is the standard to which the embankment is designed, the desired minimum static factor of safety required by the NDWR is typically 1.4 for static conditions. Based on the results from SWC's analyses of the TSFs (2008b), the proposed facility is stable under static loading conditions since the computed values (1.5 to 2.2) exceed the prescriptive factors of safety; therefore, there would be no impacts associated with geologic hazards.

3.4.3.3.3 Residual Impacts

The potential residual impacts to geology and mineral resources from the Proposed Action are an irreversible and irretrievable commitment of mineral resources through the removal of 1.1 billion pounds of Mo from the mined materials.

3.4.3.4 No Action Alternative

3.4.3.4.1 Mineral Resources

As a result of the No Action Alternative, none of the impacts to the mineral resources generated by the Proposed Action or any other alternative would occur; therefore, implementation of the No Action Alternative would restrict the development of a known mineral resource and not allow the removal of 1.1 billion pounds of Mo from the materials that would have been mined.

- **Impact 3.4.3.4-1:** A known mineral resource with 1.1 billion pounds of recoverable Mo would not be developed due to implementation of the No Action Alternative.

  Significance of the Impact: This impact is considered significant; however, no mitigation measures appear feasible.

3.4.3.4.2 Geological Hazards

The No Action Alternative would result in no impacts from geologic hazards associated with the Proposed Action. Impacts associated with normal earth dynamics (i.e., earthquakes) could occur but could not be predicted.

3.4.3.4.3 Residual Impacts

Under the No Action Alternative, residual adverse impacts to mineral resources would not occur because the known mineral resource would not be developed; however, this impact is not irreversible or irretrievable.

3.4.3.5 Partial Backfill Alternative

3.4.3.5.1 Mineral Resources

Implementation of the Partial Backfill Alternative would result in potential impacts that are similar to those outlined under the Proposed Action.

Direct impacts of the Partial Backfill Alternative on geologic and mineral resources would result in excavation of **approximately** 2.7 billion tons of ore and waste rock from the open pit with an ore to waste ratio of 1:1.6. This equates to 1.0 billion tons of ore that would be processed. A total of 1.1 billion pounds of Mo would be shipped off site, and the remainder of the material would be sent to the two tailings facilities. A total of 1.7 billion tons of waste rock would be stored in WRDFs immediately adjacent to the open pit, and then there would be the placement of 1.24 billion tons of this mined waste rock back into the open pit.

The placement of a majority of the waste rock back into the open pit, as well as the placement of the remaining WRDF immediately adjacent to the open pit could limit the future development of mineral resources located in the pit walls adjacent to the open pit should those mineral resources be amenable to development through open pit mining methods. This alternative would have impacts similar to the impacts of the Proposed Action. In addition, the placement of the waste rock back into the open pit would limit the future development of a mineral resource (see Section 3.4.2.4.11) that would be amenable to development through underground mining methods; however, there is not sufficient reasonably available geologic and resource information to more definitively address this potential impact.

- **Impact 3.4.3.5-1:** Implementation of the Partial Backfill Alternative would result in resource extraction and production of 1.1 billion pounds of Mo.

  Significance of the Impact: This is not considered a potentially significant impact to geology and minerals. However, the impact is economically significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.4.3.5-2:** Implementation of the Partial Backfill Alternative would result in the extraction of waste rock that would be placed adjacent to the open pit and then replaced within the open pit, thus limiting the future development of the identified Zn mineralization located to the north of the open pit to a degree that is greater than under the Proposed Action.

  Significance of the Impact: This is not considered a potentially significant impact to geology and minerals, because a known Zn mineralization has not been sufficiently defined and potentially could be developed using underground mining techniques.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.4.3.5.2 Geological Hazards

The potential geological hazards impacts from the Partial Backfill Alternative would be the same as those discussed under the Proposed Action.

3.4.3.5.3 Residual Impacts

The potential residual impacts to geology and mineral resources from the Partial Backfill Alternative are an irreversible and irretrievable commitment of mineral resources through the removal of 1.1 billion pounds of Mo from the mined materials.

3.4.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

3.4.3.6.1 Mineral Resources

The potential impacts to geology and mineral resources from the Off-Site Transfer of Ore Concentrate for Processing Alternative are an irreversible and irretrievable commitment of mineral resources through the removal of 1.1 billion pounds of Mo from the mined materials.

- **Impact 3.4.3.6-1:** Implementation of the Proposed Action would result in resource extraction and production of 1.1 billion pounds of Mo.

  Significance of the Impact: This is not considered a potentially significant impact to geology and minerals. However, the impact is economically significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.4.3.6-2:** Implementation of the Proposed Action would result in the extraction of waste rock that would be placed adjacent to the open pit and limit the future development of the identified Zn mineralization located to the north of the open pit.

  Significance of the Impact: This is not considered a potentially significant impact to geology and minerals, because a known Zn mineralization has not been sufficiently defined and potentially could be developed using underground mining techniques.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.4.3.6.2 Geological Hazards

The potential geological hazards impacts from the Off-Site Transfer of Ore Concentrate for Processing Alternative would be the same as those discussed under the Proposed Action.

3.4.3.6.3 Residual Impacts

The potential residual impacts to geology and mineral resources from the Off-Site Transfer of Ore Concentrate for Processing Alternative are an irreversible and irretrievable commitment of mineral resources through the removal of 1.1 billion pounds of Mo for the mined materials.

3.4.3.7 Slower, Longer Project Alternative

3.4.3.7.1 Mineral Resources

Impacts to mineral resources from the Slower, Longer Project Alternative are expected to be similar to impacts from the Proposed Action; however, impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action.

- **Impact 3.4.3.7-1:** Implementation of the Slower, Longer Project Alternative would result in resource extraction and production of 1.1 billion pounds of Mo.

  Significance of the Impact: This is not considered a potentially significant impact to geology and minerals. However, the impact is economically significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.4.3.7-2:** Implementation of the Slower, Longer Project Alternative would result in the extraction of waste rock that would be placed adjacent to the open pit and limit the future development of the identified Zn mineralization located to the north of the open pit.

  Significance of the Impact: This is not considered a potentially significant impact to geology and minerals, because a known Zn mineralization has not been sufficiently defined and potentially could be developed using underground mining techniques.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.4.3.7.2 Geological Hazards

The potential geological hazards impacts from the Slower, Longer Project Alternative would be the same as those discussed under the Proposed Action.

3.4.3.7.3 Residual Impacts

The potential residual impacts to geology and mineral resources from the Slower, Longer Project Alternative are an irreversible and irretrievable commitment of mineral resources through the removal of 1.1 billion pounds of Mo for the mined materials.

3.5 Paleontology

3.5.1 Regulatory Framework

On March 30, 2009, Paleontological Resource Protection Act (PRPA) became law when President Barack Obama signed the Omnibus Public Land Management Act (OPLMA) of 2009, Public Law 111-011. Public Law 111-011, Title VI, Subtitle D on Paleontological Resources Preservation **(PRP)** (123 Stat. 1172; 16 U.S.C. 470aaa) requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land using scientific principles and expertise. The OPLMA-PRP includes specific provisions addressing management of these resources by the BLM, NPS, Bureau of Reclamation, U.S. Fish and Wildlife Service (USFWS), and U.S. Forest Service (USFS).

The BLM manages paleontological resources under a number of federal laws including: FLPMA Sections 310 and 302(b), which directs the BLM to manage public lands to protect the quality of scientific and other values; 43 CFR 8365.1-5, which prohibits the willful disturbance, removal, and destruction of scientific resources or natural objects; 43 CFR 3622, which regulates the amount of petrified wood that can be collected for personal noncommercial purposes without a permit; and 43 CFR 3809.420 (b)(8), which stipulates that a mining operator "shall not knowingly disturb, alter, injure, or destroy any scientifically important paleontological remains or any historical or archaeological site, structure, building or object on Federal lands."

IM No. 2008-009, effective October 15, 2007, defines the BLM classification system for paleontological resources on public lands. The classification system is based on the potential for the occurrence of significant paleontological resources in a geologic unit and the associated risk for impacts to the resource based on federal management actions. This classification system for paleontological resources is intended to provide a more uniform tool to assess potential occurrences of paleontological resources and evaluate possible impacts. The system uses geologic units as base data, which are more readily available to all users, and is intended to be applied in broad approach for planning efforts, and as an intermediate step in evaluating specific projects.

The descriptions for the classes used in the Potential Fossil Yield Classification (PFYC) system are intended to serve as guidelines rather than strict definitions. Knowledge of the geology and the paleontological potential for individual units or preservational conditions should be considered when determining the appropriate class assignment.

In addition, IM No. 2009-011, effective October 10, 2008, provides guidelines for assessing potential impacts to paleontological resources in order to determine mitigation steps for federal actions on public lands under the FLPMA and the NEPA. These guidelines also apply where a federal action impacts split estate lands. This IM provides for field survey and monitoring procedures to help minimize impacts to paleontological resources from federal actions in cases where it is determined that significant paleontological resources would be adversely affected by a federal action.

These two IMs, along with the PFYC system, provide guidance for the assessment of potential impacts to paleontological resources, field survey and monitoring procedures, and recommended mitigation measures that protect paleontological resources impacted by federal actions.

It is the policy of the BLM that potential impacts from federal actions on public lands, including land tenure adjustments, be identified and assessed, and proper mitigation actions be implemented when necessary to protect scientifically significant paleontological resources. This policy also applies to federal actions impacting split estate lands and is subject to the right of landowners to preclude evaluation and mitigation of paleontological resources on their land. The removal of a significant paleontological resource from public lands requires a Paleontological Resources Use permit for collection. Significant paleontological resources collected from public lands are federal property and must be deposited in an approved repository. Paleontological resources collected from split estate lands are the property of the surface estate owner, and their disposition would be in accordance with the surface agreement between the landowner and the permittee.

Surface disturbing activities may cause direct adverse impacts to paleontological resources through the damage or destruction of fossils or loss of valuable scientific information by the disturbance of the stratigraphic context in which fossils are found. Indirect adverse impacts may be created by increased accessibility to important paleontological resources, leading to looting or vandalism. Land tenure adjustments may result in the loss of significant paleontological resources to the public if paleontological resources pass from public ownership. Generally, the Project proponent is responsible for the cost of implementing mitigation measures, including the costs of investigation, salvage, and curation of paleontological resources.

3.5.2 Affected Environment

3.5.2.1 Study Methods

The Assessment of Potential Impacts to Paleontological Resources (IM No. 2008-009) was reviewed using the PFYC system, based on current geologic mapping, to determine if impacts to paleontological resources would occur. Based on scoping of the Proposed Action in regard to paleontological resources, if initial scoping identifies the possibility for adversely affecting paleontological resources, further analysis is necessary. Guidance indicates that if there would be no impact or potential impact based on the action, or the fossil resource may be impacted but is too deep to be recovered (e.g., deep well bore passing through a fossil formation) the Project file must be documented and no additional assessment is necessary.

3.5.2.2 Existing Conditions

The open pit, WRDFs, processing facilities, and a portion of the TSFs would be located in, on, or adjacent to the Mount Hope igneous complex, which consists of rhyolitic intrusive and extrusive rocks, and thus represents a subvolcanic erosion level of a mid-Tertiary eruptive center (see Section 3.4). The western cauldron, approximately 3,300 feet in diameter, is outlined by the partial ring dike northwest and north northeast of the summit of Mount Hope and juxtaposes a 1,000-foot thick section of the lower cooling unit of the Mount Hope tuff against Vinini Formation. There would be no fossils in the rhyolitic rocks because fossils do not occur in volcanic intrusive or extrusive rocks. The extensive and complicated faulting that has occurred would also preclude stratigraphic accuracy if fossils were encountered. These units would be considered as Class 1 - Very Low.

The Devonian-Ordovician Vinini Formation is widely exposed south and west of the Mount Hope igneous complex. Thin to medium bedded shale, siltstone, chert, and conglomerate

predominate; quartzite and sandy limestone are also present. One thin but persistent sandy limestone unit divides the section into a lower sequence of dominantly argillaceous rocks, cropping out to the west, and a chert and quartzite rich upper unit to the east. The limestone bed dips and thickens easterly and may correlate with skarn present in the deep subsurface. Along the southeast side of the Mount Hope complex, the basal limestone unit of the Permian Garden Valley Formation has been preserved in a small asymmetrical syncline and overlies Vinini Formation in unconformable or possibly thrust contact. Hydrothermal alteration and mineralization affect nearly all of the Mount Hope complex and a wide area of adjacent Paleozoic sedimentary rocks. Drilling to a depth of 2,888 feet in the vicinity of the Mount Hope complex has failed to intercept lower plate carbonate rocks, which could potentially contain fossils. Patterns of alteration and metal zoning are well developed and nearly all of the original textures in both the volcanic and sedimentary rocks have been destroyed. Mapping and petrographic study allow correlation of alteration effects in igneous rocks with those in the Vinini Formation which have been metamorphosed. Any fossil presence would have been destroyed in this process. These units would be considered as Class 1 - Very Low.

The TSF constructed south of Mount Hope would be constructed in soils that overlie lacustrine and basin fill sediments. Exploration drilling southwest of Mount Hope has identified thick sequences of lacustrine deposits adjacent to the mountain front. Data from deep oil and gas exploration wells indicate that Tertiary and early Quaternary basin fill deposits are fine grained and contain considerable amounts of clay. The thickness of Tertiary deposits ranges from tens of feet to thousands of feet. Quaternary sediments in the Project Area are typically coarse grained fluvial sediments derived from the adjacent mountain blocks, fine and coarse grained alluvial fan deposits, and fine grained playa deposits. The potential exists for fossils to occur within the lacustrine lake beds; however, these fossils would be buried to an unknown depth. There is also the possibility that vertebrate fossils could be found in lake bed and spring related sediments or paleo-channel material such as the mammoth tusk that was found in Crescent Valley near the Cortez mine (BLM 2008a). Sporadic and unremarkable mammoth remains are known from many locations in Quaternary lake bed and spring related sediments throughout Nevada (BLM 1996a). These units would be considered as Class 2 - Low and 3b - Unknown.

No paleontological resources of critical scientific or educational value are known to occur within the Project Area. The nearest important fossil locality is located in the Roberts Mountains region where significant vertebrate microfossils have been recovered from the same base strata that the Mount Hope igneous complex possibly intruded. Turner and Murphy (1988) report the discovery of Siluro-Devonian vertebrate microfossils within the Roberts Mountains and Burrow (2003) describes the remains of an upper Silurian acanthodian, *Poracanthodes punctatus*, which extends the known geographic range of the taxon outside of the circum-Arctic.

Paleontological resources have been discovered in the Roberts Mountains, especially Vinini Creek, Pete Hanson Creek, and Cottonwood Canyon, and are significant for their invertebrate fossil resources because they have yielded numerous new species. Johnson (1962) reports a previously unrecorded species of brachiopod, leading to the designation of a new Middle Devonian zone from rocks in the Roberts Mountains. Ausich (1978) reports a new species of *Pisocrinus* from the Roberts Mountains which expanded the known range for this type of Silurian crinoid. Stone and Berdan (1984), based on investigations of the Late Silurian strata of the Roberts Mountains, identified three new genera and 18 new species of ostracodes. Finney et al. (2007) state, "A continuous trench exposure within the uppermost type Vinini Formation at Vinini Creek, Roberts Mountains, Nevada, provides an unparalleled opportunity to examine the

fate of graptolites, prominent Paleozoic zooplankton, during most of the Hirnantian mass extinction event".

3.5.3 Environmental Consequences and Mitigation Measures

3.5.3.1 Significance Criteria

The Proposed Action or an alternative would have a significant effect on the environment if there were sensitive paleontological resources within the Project Area that would be affected by the Project's activities.

3.5.3.2 Assessment Methodology

Impacts of the Proposed Action and Project Alternatives were assessed based on review of geologic maps and reports that have been completed in the Project Area. The significance of the impacts was evaluated based on the significance criteria listed above and through analysis based on IM Nos. 2008-009 and 2009-011.

3.5.3.3 Proposed Action

Project components associated with the open pit, WRDFs, and the processing facilities would be located in an area of geologic units that are identified as Class 1. Thus these components would have essentially no potential to impact significant paleontological resources. The TSFs and the water production field would be located in areas with Tertiary lacustrine and Quaternary basin fill sediments that could contain paleontological resources of critical scientific or educational value, and these geologic units are identified as either Class 2 or 3b. BLM review of paleontological resources found no known vertebrate or invertebrate fossils in the Project Area.

Since fossils are usually buried, their locations cannot be confirmed unless excavation occurs in those geologic units. The TSFs would be constructed on the lower portion of the soil horizons in those areas and thus would not excavate those underlying geologic units. Activities within the water production area would also occur within the soil horizons or as drilling through the geologic units. These types of activities would have no impacts to these geologic units with questionable importance for paleontological resources; therefore, the Proposed Action would not impact paleontological resources of critical scientific or educational value.

3.5.3.4 No Action Alternative

As a result of the No Action Alternative, there would be no impacts to paleontological resources since the permitted activities consist of drilling and soil excavations, which would not affect the underlying geologic formations.

3.5.3.5 Partial Backfill Alternative

Project components associated with the open pit, WRDFs, and the processing facilities under this alternative would be located in an area of geologic units that are identified as Class 1. Thus these components would have essentially no potential to impact significant paleontological resources. The TSFs and the water production field would be located in areas with Tertiary lacustrine and Quaternary basin fill sediments that could contain paleontological resources of critical scientific

or educational value, and these geologic units are identified as either Class 2 or 3b. BLM review of paleontological resources found no known vertebrate or invertebrate fossils in the Project Area.

Since fossils are usually buried, their locations cannot be confirmed unless excavation occurs in those geologic units. The TSFs would be constructed on the lower portion of the soil horizons in those areas and thus would not excavate those underlying geologic units. Activities within the water production area would also occur within the soil horizons or as drilling through the geologic units. These types of activities would have no impacts to these geologic units with questionable importance for paleontological resources; therefore, the Partial Backfill Alternative would not impact paleontological resources of critical scientific or educational value.

3.5.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Project components associated with the open pit, WRDFs, and the processing facilities under this alternative would be located in an area of geologic units that are identified as Class 1. Thus these components would have essentially no potential to impact significant paleontological resources. The TSFs and the water production field would be located in areas with Tertiary lacustrine and Quaternary basin fill sediments that could contain paleontological resources of critical scientific or educational value, and these geologic units are identified as either Class 2 or 3b. BLM review of paleontological resources found no known vertebrate or invertebrate fossils in the Project Area.

Since fossils are usually buried, their locations cannot be confirmed unless excavation occurs in those geologic units. The TSFs would be constructed on the lower portion of the soil horizons in those areas and thus would not excavate those underlying geologic units. Activities within the water production area would also occur within the soil horizons or as drilling through the geologic units. These types of activities would have no impacts to these geologic units with questionable importance for paleontological resources; therefore, the Off-Site Transfer of Ore Concentrate for Processing Alternative would not impact paleontological resources of critical scientific or educational value.

3.5.3.7 Slower, Longer Project Alternative

Project components associated with the open pit, WRDFs, and the processing facilities would be located in an area of geologic units that are identified as Class 1. Thus these components would have essentially no potential to impact significant paleontological resources. The TSFs and the water production field would be located in areas with Tertiary lacustrine and Quaternary basin-fill sediments that could contain paleontological resources of critical scientific or educational value, and these geologic units are identified as either Class 2 or 3b. BLM review of paleontological resources found no known vertebrate or invertebrate fossils in the Project Area.

Since fossils are usually buried, their locations cannot be confirmed unless excavation occurs in those geologic units. The TSFs would be constructed on the lower portion of the soil horizons in those areas and thus would not excavate those underlying geologic units. Activities within the water production area would also occur within the soil horizons or as drilling through the geologic units. These types of activities would have no impact to these geologic units with questionable importance for paleontological resources; therefore, the Slower, Longer Project Alternative would not impact paleontological resources of critical scientific or educational value.

3.6 Air and Atmospheric Values

3.6.1 Regulatory Framework

Ambient air quality and the emission of air pollutants are regulated under both federal and state laws and regulations. Regulations potentially applicable to the Proposed Action and alternatives include the following: National Ambient Air Quality Standards (NAAQS); Nevada State Ambient Air Quality Standards (NSAAQS); Prevention of Significant Deterioration (PSD); New Source Performance Standards (NSPS); Federal Operating Permit Program (Title V); and State of Nevada air quality regulations (NAC 445B). The federal and state **ambient air quality standards** are presented in Table 3.6-1.

3.6.1.1 Federal Clean Air Act

The Federal CAA, and the subsequent CAA Amendments of 1990 (CAAA), require the EPA to identify NAAQS to protect the public health and welfare. The CAA and the CAAA establish NAAQS for seven pollutants, known as "criteria" pollutants because the ambient standards set for these pollutants satisfy "criteria" specified in the CAA. The criteria pollutants regulated by the CAA and their currently applicable NAAQS set by the EPA are listed in Table 3.6-1. The list of criteria pollutants is amended by the EPA as needed to protect public health and welfare. The most recent revisions include amendments to standards for the following pollutants (dates represent publication in the FR): particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$) and particulate matter less than ten micrometers in aerodynamic diameter (PM_{10}) (October 2006), ozone (O_3) (March 2008), Pb (November 2008), nitrogen dioxide (NO_2) (February 2010), and SO_2 (June 2010). The EPA recently proposed to update the 8-hour O_3 standard (see 75 FR 2938-3052) from 0.075 ppm to somewhere between 0.060-0.070 ppm; a proposed standard is expected in 2013 **or later**. These revised limits will not be enforceable within the State of Nevada until the Nevada State Implementation Plan (SIP) is amended by the BAPC and formally approved by the EPA. **However, this NEPA analysis must compare results to all state and federal ambient air quality standards.** The current NAAQS are listed in Table 3.6-1.

3.6.1.2 Nevada State Ambient Air Quality Standards

NAC 445B.22097 includes ambient air quality standards for the State of Nevada (Table 3.6-1). The NSAAQS are generally identical to the NAAQS, with the exception of the following: (a) the 8-hour O_3 standard revised by the EPA in 2008, (b) an additional state standard for carbon monoxide (CO) in areas with an elevation in excess of 5,000 feet amsl; (c) the recently promulgated 1-hour NAAQS standards for NO_2 and SO_2, (d) the state standard for PM_{10} (Annual Arithmetic Mean) where the comparable NAAQS standard was revoked by the EPA in 2006; (e) the 24-hour and annual NAAQS standards for $PM_{2.5}$ promulgated by EPA in 2006; and (f) for some pollutants, the determination of when a violation of a state standard or federal standard occurs.

3.6.1.3 Attainment and Nonattainment Areas

Pursuant to the CAA, the EPA has developed classifications for distinct geographic regions known as air quality management areas **(AQMAs)**. Under these classifications, for each federal criteria pollutant, each air basin (or portion of an AQMA [or "planning area"]) is classified as "in

attainment" if the AQMA has "attained" compliance with (i.e., not exceeded) the adopted NAAQS for that pollutant; is classified as "non-attainment" if the levels of ambient air pollution exceed the NAAQS for that pollutant; or is classified as "maintenance" if the monitored pollutants have **improved** from non-attainment levels to attainment levels. AQMAs for which sufficient ambient monitoring data are not available are designated as "attainment-unclassifiable" for those particular pollutants until actual monitoring data support formal "attainment" or "non-attainment" classification.

In addition to the designations relative to attainment of conformance with the NAAQS, the CAA requires the EPA to place each planning area within the U.S. into one of three classes, which are designed to limit the deterioration of air quality when it is "better than" the NAAQS. "Class I" is the most restrictive air quality category and was created by Congress to prevent further deterioration of air quality in National Parks and Wilderness Areas of a given size which were in existence prior to 1977, or those additional areas that have since been designated Class I under federal regulations (40 CFR 52.21). All remaining areas outside of the designated Class I boundaries were designated Class II planning areas, which allow a relatively greater deterioration of air quality once the Minor Source Baseline Date has been set. No Class III areas have been designated. Regardless of the class of the planning area, the air quality cannot exceed the NAAQS. The nearest Class I planning area to the Project, the Jarbidge Wilderness Area, is located approximately 130 miles northeast of the Project Area. There are no Class I airsheds within 60 miles (approximately100 kilometers) of the Project Area.

Table 3.6-1: Federal and State Ambient Air Quality Standards for Criteria Pollutants

Criteria Pollutant	Averaging Period	Nevada Standards	Federal Standards	
		Concentration[a]	Primary[a]	Secondary[a]
Ozone (O_3)	1-Hour[b]	0.12 ppm (235 µg/m^3)	--	Same as Primary Standards
	8-Hour [b]	---	0.075 ppm (150 µg/m^3)	
Carbon Monoxide (CO)	8-Hour (<5,000') [c]	9 ppm (10.5 mg/m^3)	9 ppm (10 mg/m^3)	---
	8-Hour (≥5,000') [c]	6 ppm (7 mg/m^3)	9 ppm (10 mg/m^3)	
	1-Hour [c]	35 ppm (40.5 mg/m^3)	35 ppm (40 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual (Arithmetic Average)	53 ppb (100 µg/m^3)	53 ppb (100 µg/m^3)	Same as Primary Standards
	1-Hour[d]	---	100 ppb (188 µg/m^3)	---
Sulfur Dioxide (SO_2)	1-Hour[f]	75 ppb (196 µg/m^3)	196 µg/m^3 (75 ppb)	---
	Annual (Arithmetic Average)	30 ppb (80 µg/m^3)	80 µg/m^3 (30 ppb)	---
	24-Hour [c]	140 ppb (365 µg/m^3)	365 µg/m^3 (140 ppb)	---
	3-Hour [c]	500 ppb (1,300 µg/m^3)	---	1,300 µg/m^3 (500 ppb)
Particulate Matter (PM_{10})	24-Hour [c]	150 µg/m^3	---	Same as Primary Standards
	24-Hour[e] (Based on Averaged Exceedances over Three Years	---	150 µg/m^3	
	Annual Arithmetic Mean	50 µg/m^3	---	

Criteria Pollutant	Averaging Period	Nevada Standards	Federal Standards	
		Concentration[a]	Primary[a]	Secondary[a]
Particulate Matter ($PM_{2.5}$)	24-Hour (Based on the 98th Percentile Averaged over Three Years)	---	35 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean Averaged Over Three Years	---	15.0 µg/m^3	
Lead (Pb)	Rolling Three-Month Average	---	0.15 µg/m^3	Same as Primary Standards
	Calendar Quarter	1.5 µg/m^3	1.5 µg/m^3	

[a] Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm **Hg**. Measurements of air quality are corrected to a reference temperature of 25°C and a reference pressure of 760 mm **Hg** (1,013.2 millibar); units of measure for the standards are ppm by volume, parts per billion (ppb - 1 part in 1,000,000,000) by volume, milligrams per cubic meter of air (mg/m^3), and micrograms per cubic meter of air (µg/m^3).

[b] To attain the 8-hour NAAQS standard, the three-year average of the fourth highest daily maximum 8-hour average O_3 concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008). The EPA revoked the 1-hour standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding"). The 1-hour standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

[c] A violation of the federal standard occurs on the second exceedance during a calendar year; a violation of the State of Nevada standard occurs on the first exceedance during a calendar year.

[d] The 1-hour nitrogen dioxide standard is attained when the three-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area does not exceed 100 ppb (effective January 22, 2010).

[e] Not to be exceeded more than once per year on average over three years.

[f] To attain this standard, the three-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb. Final rule signed June 2, 2010.

3.6.1.4 Prevention of Significant Deterioration

Federal PSD applicability regulations limit the maximum allowable increase in ambient particulate matter in a Class I planning area, resulting from a major or minor stationary source to four µg/m^3 (annual geometric mean) and eight µg/m^3 (24-hour average). For Class II Planning areas the maximum allowable increase is 17 µg/m^3 (annual geometric mean) and 30 µg/m^3 (24-hour average). Increases in other criteria pollutants are similarly limited. Specific types of facilities that emit, or have the potential to emit, 100 tpy or more of PM_{10} or other criteria air pollutants, or any facility that emits, or has the potential to emit, 250 tpy or more of PM_{10} or other criteria air pollutants, is considered a major stationary source.

Most fugitive emissions are not counted as part of the calculation of emissions for PSD. Major stationary sources are required to notify federal land managers of Class I planning areas within 100 kilometers of the major stationary source. There are no Class I planning areas within 100 kilometers of the Project Area. As stated above, the nearest Class I planning area to the Project Area is the Jarbidge Wilderness Area. The Project air pollutant emission sources under the Proposed Action and alternatives emission sources are minor stationary sources that are not subject to PSD regulatory requirements.

3.6.1.5 New Source Performance Standards

NSPSs were established by the CAA. The standards, which are for new or modified stationary sources, require the sources to achieve the best available control technology. The NSPS apply to

specific types of processes which, in the case of the Proposed Action include certain units used to process metallic minerals. The requirements applicable to these existing units are found in 40 CFR Part 60, Subpart LL (Standards of Performance for Metallic Mineral Processing Plants).

3.6.1.6 Federal Operating Permit Program

As part of the CAA and its subsequent amendments, a facility wide permitting program was established for larger sources of pollution. This program, known as the Title V program, requires that these "major sources" of air pollutants submit a Title V permit application. To be classified as a "major source", a facility must emit more than 100 tpy of any regulated pollutant, ten tpy of any single hazardous air pollutant (HAP), or 25 tpy or more of any combination of HAPs, from applicable sources.

3.6.1.7 Nevada Air Quality Operating Permit

The CAA delegates primary responsibility for air pollution control to state governments, which in turn often delegate this responsibility to local or regional organizations. The SIP was originally the mechanism by which a state set emission limits and allocated pollution control responsibility to meet the NAAQS. The function of a SIP broadened after passage of the 1990 CAAA and now includes the implementation of specific technology based emission standards, permitting of sources, collection of fees, coordination of air quality planning, and PSD of air quality within regional planning areas and statewide. Section 176 of the CAA, as amended, requires that federal agencies must not engage in, approve, or support in any way any action that does not conform to a SIP for the purpose of attaining ambient air quality standards.

The BAPC is the agency in the State of Nevada that has been delegated the responsibility for implementing a SIP (excluding Washoe and Clark Counties, which have their own SIPs). Included in a SIP are the State of Nevada air quality permit programs (NAC 445B.001 through 445B.3485, inclusive) and the NSAAQS (see Table 3.6-1). In addition to establishing the NSAAQS, the BAPC is responsible for permit and enforcement activities throughout the State of Nevada (except in Clark and Washoe Counties).

The Proposed Action and alternatives are located in Eureka County, Nevada. The applicable permitting authority for the county is the BAPC. Before any construction of a potential source of air pollution can occur, an air quality operating permit application must be submitted to the BAPC in order to obtain an Air Quality Operating Permit.

3.6.1.8 Nevada Mercury Control Program

The BAPC is the agency in the State of Nevada delegated the responsibility for regulating the Nevada Mercury Control Program (NMCP). The NMCP became effective in May 2006 with the purpose of achieving **Hg** reduction by utilizing **Hg** control technology through implementation of Nevada Maximum Achievable Control Technology (NvMACT). The NMCP is only applicable to control **Hg** emissions from operations at precious metals mining facilities. The Proposed Action and reasonable alternatives are not subject to the NMCP because none of them would be a precious metal mining facility.

3.6.1.9 Climate Change

The BLM has developed draft guidance in the form of an IM (2008-171) for the incorporation of climate change into NEPA documents. At present, there is no regulatory program that requires reductions in greenhouse gas (GHG). However, in response to a Supreme Court decision interpreting the CAA, the EPA has published an advance notice of proposed rulemaking seeking public comment on whether GHG emissions should be regulated under the CAA, and if so, by what methods. Congress is also debating legislation that would impose regulatory controls or incentives for reducing GHG emissions.

3.6.2 Affected Environment

3.6.2.1 Study Methods

The existing meteorological and air quality conditions in the air quality study area were obtained from the sources discussed in the following sections. No air quality data have been collected at the Project, **however, one year of hourly onsite meteorological data for the year 2010 have been collected**. Baseline air quality and meteorological conditions representative of the Project Area were assessed using data from the nearby monitoring stations of north central Nevada. In the air dispersion model, **a complete, full year (2010) of the hourly on-site** meteorological data was utilized. Meteorological data from the Ely, Nevada, airport (WBO- 262631), located 80 miles southeast of the Project, was utilized for climate characterization (Figure 3.6.1). The Ely Monitoring Station measures ambient temperature, wind speed, wind direction, and precipitation, at an elevation of approximately 6,260 feet amsl.

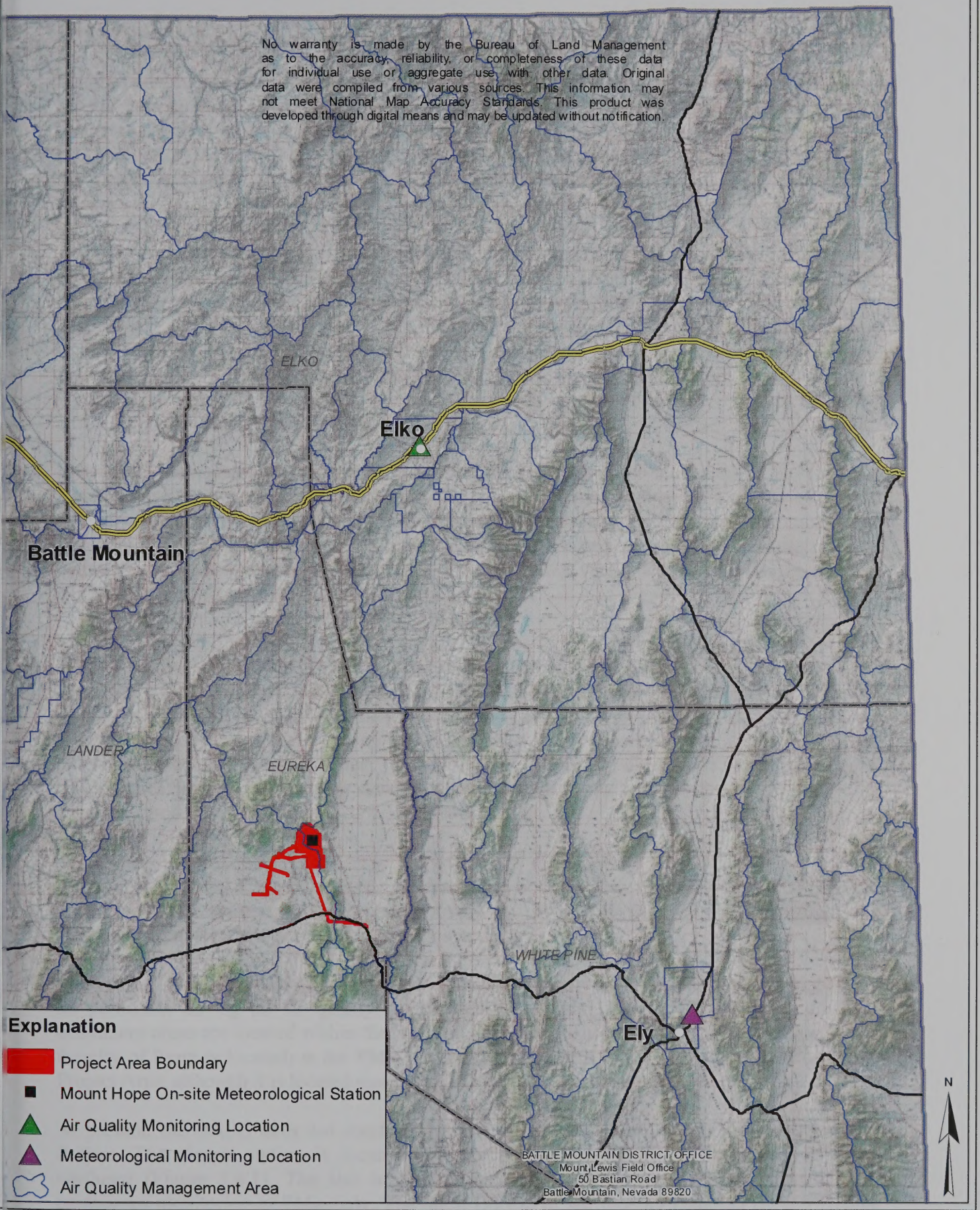
The majority of the Project permitable point source emissions would be located in the Diamond Valley AQMA, which includes the area bounded by the crest of the Sulphur Springs Range, Whistler Mountain, and the Mountain Boy Range on the west and north and the crest of the Diamond Mountains to the east. Fugitive emissions associated with vehicles, vehicle travel, mining, blasting, and material handling would occur in the Diamond Valley AQMA, as well as the Kobeh Valley AQMA. The Kobeh Valley AQMA includes an area bounded on the north by the Roberts Mountains, on the west by the Simpson Park Range, and on the east by Whistler Ridge. The southern boundary is topographically indistinct.

3.6.2.2 Existing Conditions

The Project is not included in any of the source categories listed in the Federal PSD Regulations, and the PSD applicable emissions from the Project are below the 250 tpy PSD threshold. Therefore, the Project is not in a PSD triggered planning area, increment is not being consumed, and the Project is not subject to PSD regulation.

3.6.2.2.1 Climate and Meteorology

The Project Area is a high desert environment characterized by arid to semiarid conditions, with bright sunshine, low annual precipitation, and large daily ranges in temperatures. The climate is controlled primarily by the rugged and varied topography to the west, in particular the Sierra Nevada Mountain Range. Prevailing westerly winds move warm moist Pacific air over the western slopes of the Sierra Nevada where the air cools, condensation takes place, and most of the moisture falls as precipitation. As the air descends the eastern slope, compressional warming takes place resulting in minimal rainfall.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ELKO
Elko
Battle Mountain
LANDER
EUREKA
WHITE PINE
Ely
Explanation
Project Area Boundary
Mount Hope On-site Meteorological Station
Air Quality Monitoring Location
Meteorological Monitoring Location
Air Quality Management Area
N
BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

0 10 20 30 Miles

DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD
CHECKED: -	APPROVED: RFD	DATE: 09/06/2012

FILE NAME: p1635_Fig3-6-1_MonitoringSites.mxd

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Mount Hope On-site Meteorological Station, Elko and Ely, Nevada, Monitoring Sites

Figure 3.6.1

Climate information from the Ely airport is representative of the high desert environment. Based on the data collected from the Ely station over the period 1897 through 2006, the average temperature was 44.7°F, with temperatures ranging from 101°F to minus 30°F. Annual precipitation in the area during the same period ranged from zero to 5.52 inches. The mixture of dry desert and mountainous terrain sufficiently dries the air systems that move through the region.

A key component of accessing meteorological effects on an airshed is through atmospheric dispersion. Dispersion is influenced by several parameters, including wind speed, temperature inversions (mixing heights), and atmospheric stability. Prevailing winds in 2007 at the Ely Station were typically from the southwest, with average annual wind speeds at 6.9 miles per hour (mph). Month-to-month variations were small, with average wind speeds ranging from 4.4 to 8.4 mph. These wind speeds tend to promote atmospheric mixing and generally transport locally generated air emissions away from the area. Beneficial air movement that vents an airshed is defined as an "unstable" atmospheric condition.

In "stable" atmospheric conditions, inversions would restrict vertical movement of the air in the lower atmosphere. Atmospheric pollutants are prevented from mixing with the air above the inversion layer. The resulting lower mixing heights produce higher pollutant concentrations since the volume of air with which the pollutants can mix is limited. In cold night/hot day weather patterns, mixing heights can be quite high in the afternoon versus low mixing heights at night and in the early morning due to nighttime cooling.

Mixing heights in the Project Area are estimated to be highest during the afternoon of summer months at 5,900 feet (annual average), which is conducive for good air dispersion. In the late afternoon, unstable atmospheric conditions that vent and disperse the air are favorable. Adequate mixing of air is needed during summer months when temperatures are higher and pollutants are more reactive on a local scale. During the winter months the opposite occurs. Mixing heights are much lower, approximately 250 feet (annual average), resulting in poor air dispersion. Cooler temperatures, however, effectively slow pollutant reactivity.

3.6.2.2.2 Air Quality

Air quality in the Project Area is governed by both factors of pollutant emissions and meteorological conditions. As discussed above, wind speeds, mixing heights, and stability all affect the circulation and dilution of emissions in the area.

The Project Area is located within an AQMA that is currently in "attainment-unclassifiable" for all pollutants having an air quality standard (40 CFR 81.329). No NO_2, SO_2, or Pb non-attainment areas are located within the State of Nevada. Washoe County, Nevada (within which the city of Reno is located) is the PM_{10}, CO, and O_3 non-attainment area located closest to the Project Area, although it is located more than 100 miles to the west.

At present, the BAPC does not conduct ambient air quality monitoring in the vicinity of the Project. The closest station is located in Elko, Nevada, which is approximately 75 miles northeast (Figure 3.6.1). The site is a State and Local Air Monitoring Site (SLAMS) for continuous monitoring of PM_{10} only. The latest Bureau of Air Quality Planning (BAQP) Trend Report for **1998-**2009 reported the highest 24-hour ambient PM_{10} concentration to be **150** $\mu g/m^3$.

The mean concentration measured for a 24-hour period for PM_{10} during 2009 was only 25 $\mu g/m^3$ (Table 3.6-2) (http://ndep.nv.gov/baqp/ monitoring/**docs/trend.pdf**).

Table 3.6-2: Ambient PM_{10} Monitoring Data from the Elko Site

Year	24-Hour Average PM_{10} Concentration ($\mu g/m^3$)		
	1st High	2nd High	Arithmetic Mean
1998	100	70	22
1999	80	80	25
2000	90	80	25
2001	100	70	25
2002	150	90	22
2003	110	80	19
2004	80	70	21
2005	90	70	21
2006	130	130	26
2007	90	90	26
2008	40	40	15
2009	140	130	25
Average	100.0	83.3	22.7

3.6.2.2.3 Climate Change

Ongoing scientific research has identified the potential impacts of anthropogenic (man-made) GHG emissions and changes in biological **C** sequestration due to land management activities on global climate. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological **C** sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil **C** sources have caused carbon dioxide equivalent ($CO_2(e)$) concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The Intergovernmental Panel on Climate Change (IPCC) in 2007 concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations" (IPCC 2007a).

Global mean surface temperatures have increased nearly 1.8˚F from 1890 to 2006. Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24˚N) have exhibited temperature increases of nearly 2.1 ˚F since 1900, with nearly a 1.8˚F increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2001, the IPCC indicated that by the year 2100, global average surface temperatures would increase 2.5 to 10.4˚F above 1990 levels. The National Academy of Sciences has confirmed these findings, but also has indicated there are uncertainties regarding how climate change may

affect different regions. Computer model predictions indicate that increases in temperature would not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures. Increases in temperatures would increase water vapor in the atmosphere, and reduce soil moisture, increasing generalized drought conditions, while at the same time enhancing heavy storm events. Although large-scale spatial shifts in precipitation distribution may occur, these changes are more uncertain and difficult to predict. "As with any field of scientific study, there are uncertainties associated with the science of climate change. This does not imply that scientists do not have confidence in many aspects of climate change science. Some aspects of the science are known with virtual certainty, because they are based on well-known physical laws and documents trends" (EPA 2008a).

Several activities contribute to the phenomena of climate change, including emissions of GHGs (especially CO_2 and methane) from fossil fuel development, large wildfires and activities using combustion engines; changes to the natural **C** cycle; and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs would have a sustained climatic impact over different temporal scales. For example, recent emissions of CO_2 can influence climate for 100 years.

It may be difficult to discern whether global climate change is already affecting resources, let alone the area of the Proposed Action. In most cases there is more information about potential or projected effects of global climate change on resources. It is important to note that projected changes are likely to occur over several decades to a century. Therefore, many of the projected changes associated with climate change may not be measurably discernible within the reasonably foreseeable future.

3.6.3 Environmental Consequences and Mitigation Measures

The Project would require an Air Quality Operating Permit from the BAPC. The main impact related to air quality would be the result of increased pollutant concentrations. The Project would increase emissions of regulated pollutants from PSD applicable sources and sources applicable to the NSPS regulations. The Project would not result in emissions of any regulated pollutant above 250 tpy**; therefore,** the Project **is not subject** to PSD regulations or Title V application requirements.

3.6.3.1 Significance Criteria

The Proposed Action would have a significant effect on the environment if any of the following would occur:

- Violate any regulatory requirement of the BAPC;
- Violate any state or federal ambient air quality standard;
- Contribute substantially to an existing or projected air quality violation; or
- Expose sensitive receptors to substantial pollutant concentrations.

3.6.3.2 Assessment Methodology

In order to evaluate the impacts of the Project, an assessment of the significance of the impacts was made based on the significance criteria listed above. The air quality analyses quantified the emissions of the applicable criteria pollutants from the mining and processing of ore from the Project.

An air dispersion modeling analysis was utilized to characterize the Project. The air pollution sources at the Project that were modeled in the air dispersion modeling analysis include the following source categories:

- Process emission points (material handling, crushing, conveying, leaching, drying, roasting, etc.);
- Auxiliary sources (emergency generators, etc.); and
- Fugitive emission sources (drilling, blasting, loading, unloading, hauling, wind erosion, mobile machinery tailpipes, etc.).

Air emission estimates were calculated based on the maximum material throughput for each applicable time period, using EPA approved AP-42 emission factors for the Project and information provided by EML. Table 3.6-3 shows the emissions, in tpy, that were used in the model **for this EIS analysis**.

3.6.3.2.1 Model Selection and Options

The most recent version (**11353**) of the AERMOD modeling system was used for the air quality impact analyses. AERMOD was run using regulatory default options (Air Sciences Inc. 2012a; EML 2008b).

Process and insignificant sources with exhaust stacks such as generators, boilers, dryer, roasters, baghouse/dust collector equipped dust sources (crusher, apron feeder, etc.), and process fugitive sources such as truck dump and conveyors are modeled as point sources. All fugitive source activities such as the pit, the primary crusher stockpile, the waste storage sites, the coarse and low-grade ore storage sites, and the tailings storage facility are modeled as volume sources. Each haul road section is characterized by a series of volume sources with length not exceeding twice the road width (Air Sciences Inc. 2012a).

Table 3.6-3: Modeled Emission Rates

Model and Source Category	Annual Emissions (tons/year)					
	PM_{10}	$PM_{2.5}$	NO_2	SO_2	CO	VOC[1]
Point and Process Fugitive Sources	**98.1**	**86.6**	**61.2**	**98.1**	**22.2**	49.2
Fugitive and Tailpipe Sources	**876.9**	**111.3**	**881.7**	**64.2**	**1,326.5**	263.0
Total	**975.0**	**197.9**	**942.9**	**162.4**	**1,348.7**	312.2

[1](VOC) volatile organic compound.

The effects of building induced downwash were incorporated into the air quality modeling analyses. Building downwash parameters were calculated using the most recent version of the

Building Profile Input Program (BPIP) with Plume Rise Model Enhancement (PRIME) algorithm (BPIP-PRIME version 04274) and the August 28, 2008, version of the buildings layout (Air Sciences Inc. 2012a).

3.6.3.2.2 Receptors

The receptor data were utilized in the modeling analyses to access ground level impacts from the Project facility emissions. **Discrete receptors located at 100-meter spacing out to two kilometers in each direction from the facility boundary were included. Receptors within the fenced boundary were not modeled since these receptors inside the boundary would not be considered ambient.**

Receptors placed at a 25-meter spacing along the facility public exclusion boundary line are also included in the models. Receptors within the facility public exclusion boundary were not modeled.

A group of sensitive receptors has been evaluated in the air dispersion modeling analysis. This group includes receptors placed at nearby ranches, permanent dwellings, designated campgrounds, and the Town of Eureka. These sensitive receptors are provided in the Table 3.6-4.

Table 3.6-4: Sensitive Receptors and Universal Transverse Mercator Coordinates

Receptor	Universal Transverse Mercator (UTM) Coordinates	
	Easting (meters [m])	Northing (m)
Bailey North Ranch	**580,043**	**4,419,188**
Bailey South Ranch	**581,599**	**4,396,519**
Benson	**584,817**	**4,396,554**
Eureka County High School	**588,204**	**4,374,062**
Eureka Elementary School	**589,341**	**4,373,756**
Eureka County Medical Clinic	**589,358**	**4,374.008**
Alpha Ranch	**568,465**	**4,428,941**
Roberts Creek Ranch	**560,933**	**4,400,378**
Tonkin Reservoir	**550,030**	**4,418,098**

In addition, 100 receptors each along the boundaries of the Jarbidge Wilderness Area (a designated federal Class I area) and the Great Basin National Park that were closest to the Project Area were also modeled.

All the receptors are processed with the AERMOD Terrain preprocessor AERMAP to generate receptor terrain elevations and hill height values using the 30-meter resolution USGS 7.5-minute

Digital Elevation Model (DEM) Files (Air Sciences, Inc. 2012a). The modeled sources, fenceline, and receptor grid locations are shown in Figure 3.6.2.

3.6.3.2.3 Meteorological Data

A complete full year (2010) hourly on-site meteorological data were utilized. **Missing data were substituted with the upper-air (soundings) and cloud cover data from the Elko station and surface data from the Eureka Airport station. The most recent version (11059) of the AERMOD meteorological preprocessor AERMET was used to process these data and generate AERMOD input-ready meteorological data files (Air Sciences, Inc. 2012a).** A wind frequency distribution of the meteorological data is illustrated on Figure 3.6.3.

3.6.3.2.4 Modeled Pollutants and Assumptions

The air quality impact analyses include modeling for the following air pollutants and averaging periods. These data are presented in Table 3.6-5.

Table 3.6-5: Air Pollutants and Applicable Averaging Times for the Air Quality Modeling

Pollutant	Averaging Time[a]
PM_{10}	24-Hour
	Annual
$PM_{2.5}$	24-Hour
	Annual
Pb	Quarterly
CO	1-Hour
	8-Hour
NO_2	1-Hour
	Annual
SO_2	1-Hour
	3-Hour
	24-Hour
	Annual

[a] All concentrations are applicable at any point of public access.

Pb emissions were calculated by multiplying the Pb constituent with PM emissions, which are calculated based on PM_{10}/PM ratio of 0.35. **The Pb NAAQS is based on a three-month rolling averaging period. A monthly averaging period was used to model Pb emissions because the AERMOD does not have an option for modeling a three-month averaging period. The maximum monthly concentrations are higher than the three-month rolling average concentrations, therefore, comparison of the maximum monthly concentrations to the**

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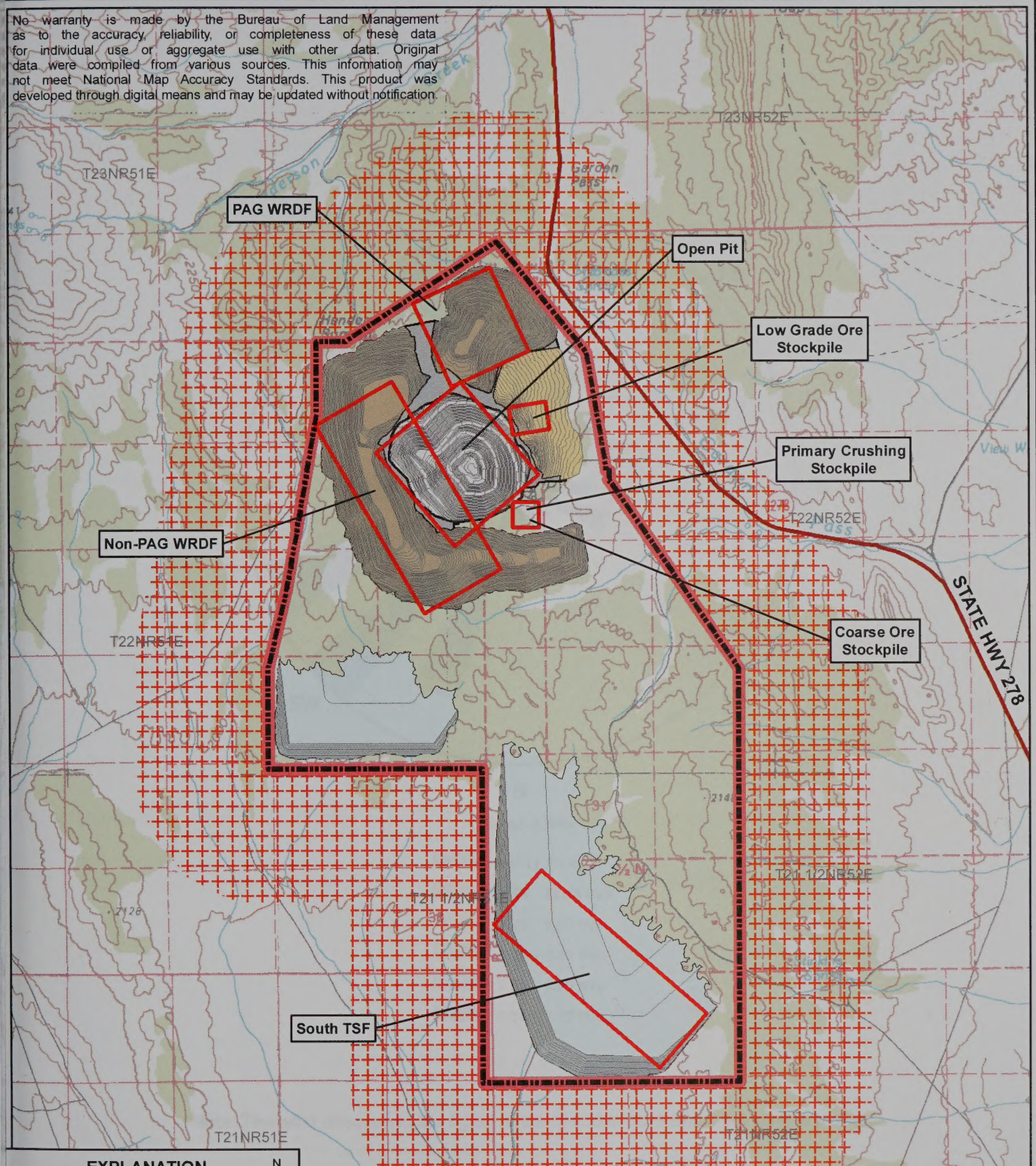

EXPLANATION

- BLM Wire Fence
- Modeling Sources
- Boundary Line Receptors 25-meter spacing
- Discrete Receptors 100-meter spacing
- Pit (50' Contours)
- Interpit Area
- Low Grade Ore Stockpile (25' Contours)
- Tailing Storage Facilities (20' Contours)
- Waste Rock Disposal Facilities (20' Contours)

N

0 0.5 1 1.5 Miles

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Battle Mountain, Nevada 89820

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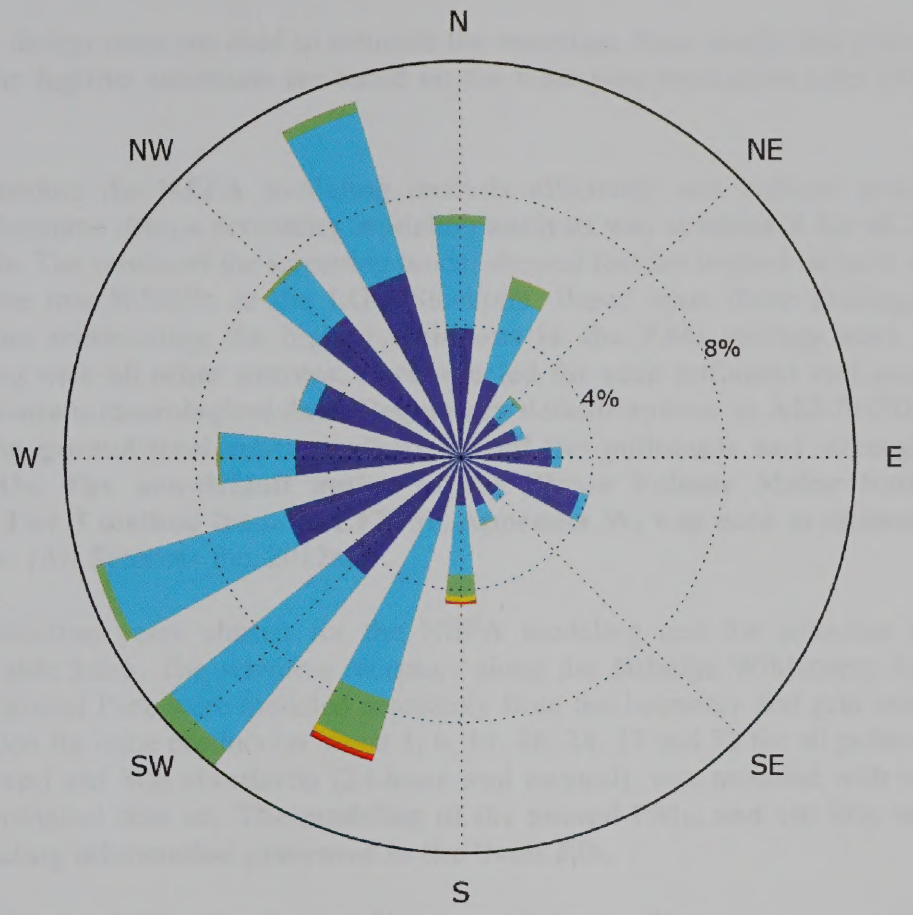
MOUNT HOPE PROJECT

DRAWING TITLE:

Model Sources, Fenceline, and Receptor Locations

Figure 3.6.2



Calms: 2.9%

- >= 11.75 m/s
- 9.50 - 11.75 m/s
- 7.25 - 9.50 m/s
- 5.00 - 7.25 m/s
- 2.75 - 5.00 m/s
- 0.50 - 2.75 m/s

Note: The wind direction in the figure is the direction from which the wind is blowing.

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BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Mount Hope 2010 On-site Meteorology - Wind Frequency Distribution Diagram

Figure 3.6.3

three-month rolling average concentrations is conservative approach to estimating the concentration (Air Sciences Inc. 2012a).

The maximum design rates are used to estimate the emissions from stacks and process fugitive sources, and the fugitive emissions are based on the mine year production rates (Air Sciences Inc. 2012a).

In order to conduct the **NEPA modeling** analysis efficiently and without generating and analyzing cumbersome data, **a screening modeling analysis was conducted for all 32 years of active mine life.** The results of the screening model showed that the highest impacts were driven by either of the two WRDFs or the LGO Stockpile. Based upon these findings, the mine production years representing the highest **emissions in the PAG storage area and LGO stockpile, along with all other sources, were selected for each pollutant and modeled with one year of on-site meteorological data. Regulatory default options in AERMOD were used to estimate the ground-level concentrations for all the pollutants and averaging period except for NO_2. The non-default option of the Plume Volume Molar Ratio Method (PVMRM), a Tier 3 method from 40 CFR 51, Appendix W, was used to estimate the NO_2 concentrations.** (Air Sciences Inc. 2012a).

The mine production years chosen for the NEPA modeling and the selection criteria are presented in Table 3.6-6. The sensitive receptors along the Jarbidge Wilderness Area and the Great Basin National Park were modeled separately from the boundary and grid receptors. The highest emissions for mine production Years **1, 6, 16, 20, 24, 27** and **32** for all pollutants **except annual PM_{10} and old SO_2 standards (24-hour and annual)**, was modeled with **one year of on-site** meteorological data set. **The modeling of the annual PM_{10} and old SO_2 standards is from the modeling information presented in the Draft EIS.**

Table 3.6-6: Modeled Mine Production Years and Selection Criteria

Pollutant	Mine Production Year	Selection Criteria
All	Year 24	Highest cumulative and individual emissions for all pollutants
	Year 6	Year of highest impact in screen model runs
CO	Year 1	Highest emissions in PAG
	Year 27	Highest emissions in Non-PAG
	Year 16	Highest emissions in LGO Stockpile
NO_2	Year 24	Highest emissions in PAG
	Year 27	Highest emissions in Non-PAG
	Year 16	Highest emissions in LGO Stockpile
PM_{10}, $PM_{2.5}$, and Pb	Year 1	Highest emissions in PAG
	Year 20	Highest emissions in Non-PAG
	Year 16	Highest emissions in LGO Stockpile
SO_2	Year 1	Highest emissions in PAG
	Year 27	Highest emissions in Non-PAG
	Year 32	Highest emissions in LGO stockpile

3.6.3.2.5 Applicable Air Quality Standards

The background concentrations are added to the modeled impact to estimate the total pollutant concentrations, which were compared with the NAAQS for compliance demonstrations. The NAAQS are presented in Table 3.6-1.

3.6.3.2.6 Background Concentrations

To assess the impact of the Project on the ambient air quality, it was necessary to account for existing, or background, levels for each pollutant. No monitoring has been performed within the Project Area for ambient concentrations of CO, NO_2, O_3, or SO_2, nor does the BAPC specify background concentrations for these pollutants. However, background values are necessary for the purpose of comparing modeled results to the NAAQS and NSAAQS. **The BAPC was contacted to obtain representative background concentrations for the modeling analysis. The BAPC recommended background concentrations are presented in Table 3.6-7.**

Table 3.6-7: Background Values for Criteria Pollutants

Pollutant	Averaging Period	Monitor Location	Year	Background Concentration ($\mu g/m^3$)	Reference
PM_{10}	24-Hour	NV Rural Area Default, **Great Basin NP**	**N/A**	10.2	BAPC
	Annual	NV Rural Area Default	**N/A**	9.0	BAPC
$PM_{2.5}$	24-Hour[3]	Great Basin NP	2005-2007	7.0	**BAPC [1]**
	Annual[4]	Great Basin NP	2005-2007	2.4	BAPC
CO	1-Hour	**N/A**	**N/A**	**0**	**BAPC [2]**
	8-Hour	**N/A**	**N/A**	**0**	**BAPC [2]**
NO_2	1-Hour	**N/A**	**N/A**	**0**	**BAPC [2]**
	Annual	**N/A**	**N/A**	**0**	**BAPC [2]**
SO_2	1-Hour	**N/A**	**N/A**	**0**	**BAPC [2]**
	3-Hour	**N/A**	**N/A**	**0**	**BAPC [2]**
	24-Hour	Boulder City, Clark Co., NV	2001-2003	13.1	EPA Air Data*
	Annual	Boulder City, Clark Co., NV	2001-2003	2.6	EPA Air Data*
Pb	Quarterly	**N/A**	**N/A**	0	BAPC

* http:///www.epa.gov/air/data/index.html
[1] Randy Philips, BAPC, March 19, 2008
[2] Greg Remer, BAPC, March 19, 2007
[3] 3-year average of the 98th percentile of 24-hour measurements
[4] 3-year average of the weighted annual mean measurements

The PM_{10} background concentrations are the default Nevada values recommended by the BAPC for unmonitored rural areas like the Project Area. For the $PM_{2.5}$ background, monitoring aerosol data from Great Basin National Park were used. **The BAPC recommends assuming zero background for CO, NO_2, and SO_2 for unmonitored rural areas similar to the Project Area** (Air Sciences Inc. 2012a).

3.6.3.3 Proposed Action

The Proposed Action consists of many activities and actions, each of which may have the potential to emit air pollutants. NAC 445B.187 defines "stationary source" as "...any building, structure, facility, or installation, including temporary sources which emits or may emit any regulated air pollutant that is regulated under ... NAC445B.001 to NAC445B.3485." NAC 445B.059 further defines "emission unit" as, "... a part of a stationary source that emits or has the potential to emit any regulated air pollutant." A comprehensive list of the sources of air pollutant emissions, resulting either directly from the Proposed Action or from indirectly related facilities used to process ore from the Proposed Action are presented in Table 3.6-8.

Table 3.6-8: List of Sources Analyzed for the Mount Hope Project

Emission Unit Description	Pollutants*
Primary Crusher (PC) Dump Pocket	PM_{10}, $PM_{2.5}$, Pb, HAPs
Primary Crusher & Apron Feeder Discharge	PM_{10}, $PM_{2.5}$, Pb, HAPs
Transfer to Coarse Ore Conveyor	PM_{10}, $PM_{2.5}$, Pb, HAPs
Transfer to Course Ore Stockpile	PM_{10}, HAPs
Reclaim Apron Feeder Transfer	PM_{10}, HAPs
Conveyor Transfer to SAG Mill	PM_{10}, HAPs
Pebble Crusher and Discharge	PM_{10}, HAPs
Sodium Metasilicate Silo Loading	PM_{10}, HAPs
Sodium Metasilicate Silo Unloading	PM_{10}, HAPs
Boiler for Dryer	CO, NO_2, PM_{10}, $PM_{2.5}$, Pb, SO_2, VOC, HAPs
Concentrate Dryer	CO, NO_2, PM_{10}, $PM_{2.5}$, Pb, SO_2, VOC, HAPs
Concentrate Transfer to Roasters via Conveyors, Bins, and Bucket Elevators	PM_{10}, $PM_{2.5}$, Pb, HAPs
Concentrate Roasters (1 and 2)	CO, NO_2, PM_{10}, $PM_{2.5}$, Pb, SO_2, VOC, HAPs
Primary and Secondary Screening	PM_{10}, $PM_{2.5}$, Pb, HAPs
TMO/ Rock Breaker- Roaster Building	PM_{10}, $PM_{2.5}$, Pb, HAPs
TMO Transfer to Packaging via Conveyors, Bins, and Bucket Elevators	PM_{10}, $PM_{2.5}$, Pb, HAPs
Lime Silo 1 Loading	PM_{10}, $PM_{2.5}$, HAPs
Lime Silo 1 Discharge	PM_{10}, $PM_{2.5}$, HAPs
Lime Silo 2 Loading	PM_{10}, $PM_{2.5}$, HAPs
Lime Silo 2 Discharge	PM_{10}, $PM_{2.5}$, HAPs
FeMo Plant- Batch Reactor	PM_{10}, $PM_{2.5}$, Pb, HAPs
FeMo Mixer	PM_{10}, $PM_{2.5}$, Pb, HAPs
FeMo Jaw Crusher	PM_{10}, $PM_{2.5}$, Pb, HAPs
FeMo Transfer to Packaging via Conveyors, Bins, and Bucket Elevators	PM_{10}, $PM_{2.5}$, Pb, HAPs
TMO Transfers, Handling, and Packaging	PM_{10}, $PM_{2.5}$, Pb, HAPs
FeMo Transfers, Handling, and Packaging	PM_{10}, $PM_{2.5}$, Pb, HAPs
Emergency Generator – Portable	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Emergency Generator - Truck Shop	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs

Emission Unit Description	Pollutants*
Emergency Generator - Mill Building	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Emergency Generator - Tailings Pump House	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Mill Maintenance - General Heating	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Mine Maintenance - General Heating	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Filter/Packaging - General Heating	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - FeMo Plant - General Heating	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
100,000 Gallon #2 Fuel Oil Tank	VOC, HAPs
Diesel Storage Tank	VOC, HAPs
Diesel Storage Tank	VOC, HAPs
Diesel Storage Tank	VOC, HAPs
Boiler - Mill Maintenance - Office Heating	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Mill Maintenance - Shower Boiler	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Mine Maintenance - Office Heating	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Mine Maintenance - Shower Boiler	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Truck Wash - General Heating	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Truck Wash - Wash Steamer	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Administration	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Administration	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Laboratory - General Heating	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Laboratory - Water Heater	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Health and Safety - General Heating	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Health and Safety - Water Heater	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Boiler - Truck Shop - General Heating	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Antifreeze Storage Tank	VOC, HAPs
Used Antifreeze Storage Tank	VOC, HAPs
Used Oil Storage Tank	VOC, HAPs
Truck Maintenance Fluid Storage Tank	VOC, HAPs
ATF Storage Tank	VOC, HAPs
Engine Oil Storage Tank	VOC, HAPs
Gear Oil Storage Tank	VOC, HAPs
Hydraulic Fluid Storage Tank	VOC, HAPs
Engine Oil Storage Tank	VOC, HAPs
Used Antifreeze Storage Tank	VOC, HAPs
Used Oil Storage Tank	VOC, HAPs
Gasoline Storage Tank	VOC, HAPs
Highway Diesel Storage Tank	VOC, HAPs
Fuel Oil #2/ MIBC Blend Storage Tank	VOC, HAPs
MIBC Storage Tank	VOC, HAPs
Pine Oil Storage Tank	VOC, HAPs
Fuel Oil #2 Storage Tank	VOC, HAPs
Fuel Oil Storage Tank	VOC, HAPs

Emission Unit Description	Pollutants*
Hydrochloric Acid Storage Tank	VOC, HAPs
Drilling	PM_{10}, $PM_{2.5}$, Pb, HAPs
Blasting	CO, NO_2, PM_{10}, $PM_{2.5}$, Pb, SO_2, HAPs
HG Ore - In-Pit Loading	PM_{10}, $PM_{2.5}$, Pb, HAPs
HG Ore - Stockpile Unloading	PM_{10}, $PM_{2.5}$, Pb, HAPs
HG Ore - Stockpile Loading	PM_{10}, $PM_{2.5}$, Pb, HAPs
LGO In-Pit Loading	PM_{10}, $PM_{2.5}$, Pb, HAPs
LGO Stockpile Unloading	PM_{10}, $PM_{2.5}$, Pb, HAPs
Waste - In-Pit Loading	PM_{10}, $PM_{2.5}$, Pb, HAPs
Waste - PAG Unloading	PM_{10}, $PM_{2.5}$, Pb, HAPs
Waste – Non-PAG Unloading	PM_{10}, $PM_{2.5}$, Pb, HAPs
LGO Stockpile Loading	HAPs
Wind Erosion - PC Stockpile	PM_{10}, $PM_{2.5}$, Pb, HAPs
Wind Erosion - LG Stockpile	PM_{10}, $PM_{2.5}$, Pb, HAPs
Wind Erosion - PAG	PM_{10}, $PM_{2.5}$, Pb, HAPs
Wind Erosion - Non-PAG	PM_{10}, $PM_{2.5}$, Pb, HAPs
Wind Erosion - Course HG Stockpile	PM_{10}, $PM_{2.5}$, Pb, HAPs
Wind Erosion - Pit to PC Haul Road	PM_{10}, $PM_{2.5}$, Pb, HAPs
Wind Erosion - Pit to Low-Grade Ore Stockpile Haul Road	PM_{10}, $PM_{2.5}$, Pb, HAPs
Wind Erosion - Pit to PAG Haul Road	PM_{10}, $PM_{2.5}$, Pb, HAPs
Wind Erosion - Pit to Non-PAG Haul Road	PM_{10}, $PM_{2.5}$, Pb, HAPs
Wind Erosion - Tailings Storage Facility	PM_{10}, $PM_{2.5}$, Pb, HAPs
Haul - HG Ore to PC & Stockpile	PM_{10}, $PM_{2.5}$, Pb, HAPs
Haul - LG Ore to Stockpile	PM_{10}, $PM_{2.5}$, Pb, HAPs
Haul - Waste to PAG	PM_{10}, $PM_{2.5}$, Pb, HAPs
Haul - Waste to Non-PAG	PM_{10}, $PM_{2.5}$, Pb, HAPs
Haul - LG Stockpile to PC	PM_{10}, $PM_{2.5}$, Pb, HAPs
Tailpipe - Loaders	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Tailpipe - Haul Trucks	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Tailpipe - Dozers	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Tailpipe - Graders	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Tailpipe - Water Trucks	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Tailpipe - Excavators	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Tailpipe - Blasthole Drills	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Tailpipe - Hydraulic Shovel	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs
Paved Road Travel - Commuter Buses	PM_{10}, $PM_{2.5}$, HAPs
Tailpipe - Commuter Buses	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, VOC, HAPs

* - Hazardous air pollutant (HAP) emissions could occur from any or all sources.

3.6.3.3.1 PM_{10}, $PM_{2.5}$, and Pb Emissions and Modeled Concentrations

PM_{10} emissions are generated by almost all sources in Table 3.6-8. The major sources of PM_{10} and $PM_{2.5}$ emissions include resuspension of unpaved road dust from haul trucks, wind erosion of the WRDFs and the ore storage stockpiles, as well as processing material using crushers, screens, and conveyors, and emissions from blasting operations. Emission controls such as watersprays help minimize emissions from the material process equipment (i.e., crushers, screens, conveyors, etc.) (AirSciences Inc. 2010; 2011a; 2011b**; 2012a**).

The $PM_{10}/PM_{2.5}$ emissions from the bus transportation of the employees on public roads to and from the Project Area would total 2.86 tpy (AirSciences Inc. 2011c). These emissions would be from engine exhaust, tire and brake wear, and fugitive dust generated from bus travel on paved roads. These emissions would have an incremental impact on the air quality in the vicinity of the transportation route.

The potential for indirect fugitive dust emissions from the ground water production exists as a result of the Proposed Action. As discussed under Section 3.2, the ground water pumping in Kobeh Valley would result in the lowering of the **water** table in Kobeh Valley. As discussed in Section 3.9, a phreatophytic vegetation community exists in Kobeh Valley where the current water table is near the ground surface. Should the water table be lowered a sufficient distance, the current vegetation community in this area may shift to another community, have a lower population density (less individual plants per given area), or there may be an area without any vegetation. Should this occur and there are sufficient activities in that area to keep the soil surface from crusting, then the wind would result in the creation of wind-blown fugitive dust. These emissions would have an incremental impact on the air quality in the vicinity of the Kobeh Valley.

The maximum modeled ambient PM_{10} concentration in the NEPA modeling analysis, including background concentrations, for modeled years of highest impact (Years 1, 6, 16, 20, **24, 27,** and **32**) at any point of public access **is 58.6** µg/ m^3 per 24-hour time period with **2010 on-site** meteorological data, and 20.8 µg/m^3, annual arithmetic average with 1988 meteorological data (Table 3.6-9). The maximum modeled ambient $PM_{2.5}$ concentration in the NEPA modeling analysis, including background concentrations, for modeled years of highest impact (Years 1, 6, 16, 20, **24, 27,** and **32**) at any point of public access are **23.0** µg/ m^3 per 24-hour time period and **6**.5 µg/ m^3, annual arithmetic average with **2010 on-site** meteorological data (Table 3.6-9). The modeled high concentration for Pb is substantially below the NSAAQS and NAAQS standards.

Table 3.6-9: Highest Modeled Air Pollutant Concentrations from the Proposed Action at Receptor Points Accessible to the Public

Pollutant	Averaging Time	Met. Data Year	Highest Modeled Receptor Point			Lowest Applicable Ambient Standard (µg/m^3)
			Receptor Location[1]		Dispersion Modeling Results (µg/m^3)[2]	
			UTM Easting (m)	UTM Northing (m)		
PM_{10}	24-Hour	**2010**	**572,288**	**4,405,086**	**58.6**	150
	Annual	1988	569,680	4,407,572	20.7	50
$PM_{2.5}$	24-Hour	**2010**	**572,317**	**4,404,913**	**23.0**	35

Pollutant	Averaging Time	Met. Data Year	Highest Modeled Receptor Point			Lowest Applicable Ambient Standard ($\mu g/m^3$)
			Receptor Location[1]		Dispersion Modeling Results ($\mu g/m^3$)[2]	
			UTM Easting (m)	UTM Northing (m)		
	Annual	**2010**	**572,400**	**4,404,700**	**6.5**	15
SO_2	1-Hour	**2010**	**572,400**	**4,404,600**	**62.3**	196
	3-Hour	**2010**	**572,449**	**4,404,521**	**32.9**	1,300
	24-Hour	1991	567,700	4,405,600	29.3	365
	Annual	1992	572,386	4,404,696	4.3	80
CO	1-Hour	**2010**	**569,825**	**4,407,667**	**324.5**	40,000
	8-Hour (< 5,000')	**2010**	**572,400**	**4,404,700**	**110.0**	10,000
	8-Hour (≥ 5,000')	**2010**	**572,400**	**4,404,700**	**110.0**	6,667
Pb	1-Month	**2010**	**572,308**	**4,404,962**	**0.007**	0.15
NO_2	1-Hour	**2010**	**572,284**	**4,405,111**	**162.1**	188
	Annual	**2010**	**572,400**	**4,404,700**	**14.1**	100

[1] All coordinates in UTM projection, North American Datum 1983.
[2] Background values, as listed in Table 3.6-7 are included.

The modeled high concentration receptor locations for the NEPA modeling analysis is shown in Figure 3.6.4.

- **Impact 3.6.3.3-1:** Emissions of PM_{10}, $PM_{2.5}$, and Pb would be generated by numerous processes as a result of the Proposed Action, including the resuspension of road dust, wind erosion of exposed dirt surfaces, and activities related to the processing of ore materials. These activities are inherent to the mining process and would be ongoing throughout the life of the Proposed Action. The modeled PM_{10}, $PM_{2.5}$, and Pb concentrations show levels below the NSAAQS and NAAQS, even with the addition of the background values.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.3.2 Combustion Emissions and Modeled Concentrations

Combustion of diesel in the haul trucks and mobile equipment, such as loaders, dozers, etc., the combustion of propane in processing units such as the boilers, and the combustion of fuel oil or diesel in units such as the roaster, can produce elevated ambient levels of CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and O_3 (from VOC emissions). In most cases, combustion emissions are generally uncontrolled for the emissions units. Despite the lack of tailpipe emissions control technology for combustion sources throughout the Project Area, the maximum modeled CO, NO_2, and SO_2 concentrations from the modeling analysis is well below either the NSAAQS or the NAAQS.

The modeled results, including background concentrations, for each pollutant for each applicable averaging time are shown in Table 3.6-9.

The CO, NO_2, SO_2, and VOC emissions from the bus transportation of the employees on public roads, to and from the Project Area total 2.32, 4.97, 0.01, and 0.25 tpy, **respectively** (Air Sciences Inc 2011c). These emissions would be from engine exhaust. These emissions would have an incremental impact on the air quality in the vicinity of the transportation route.

- **Impact 3.6.3.3-2:** Combustion emissions of CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and VOC would be generated by numerous processes as a result of the Proposed Action, including combustion emissions from diesel engines and burning propane, fuel oil, or diesel in various process equipments. The modeled CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and VOC show levels below the NSAAQS and NAAQS.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.3.3 HAPs Emissions

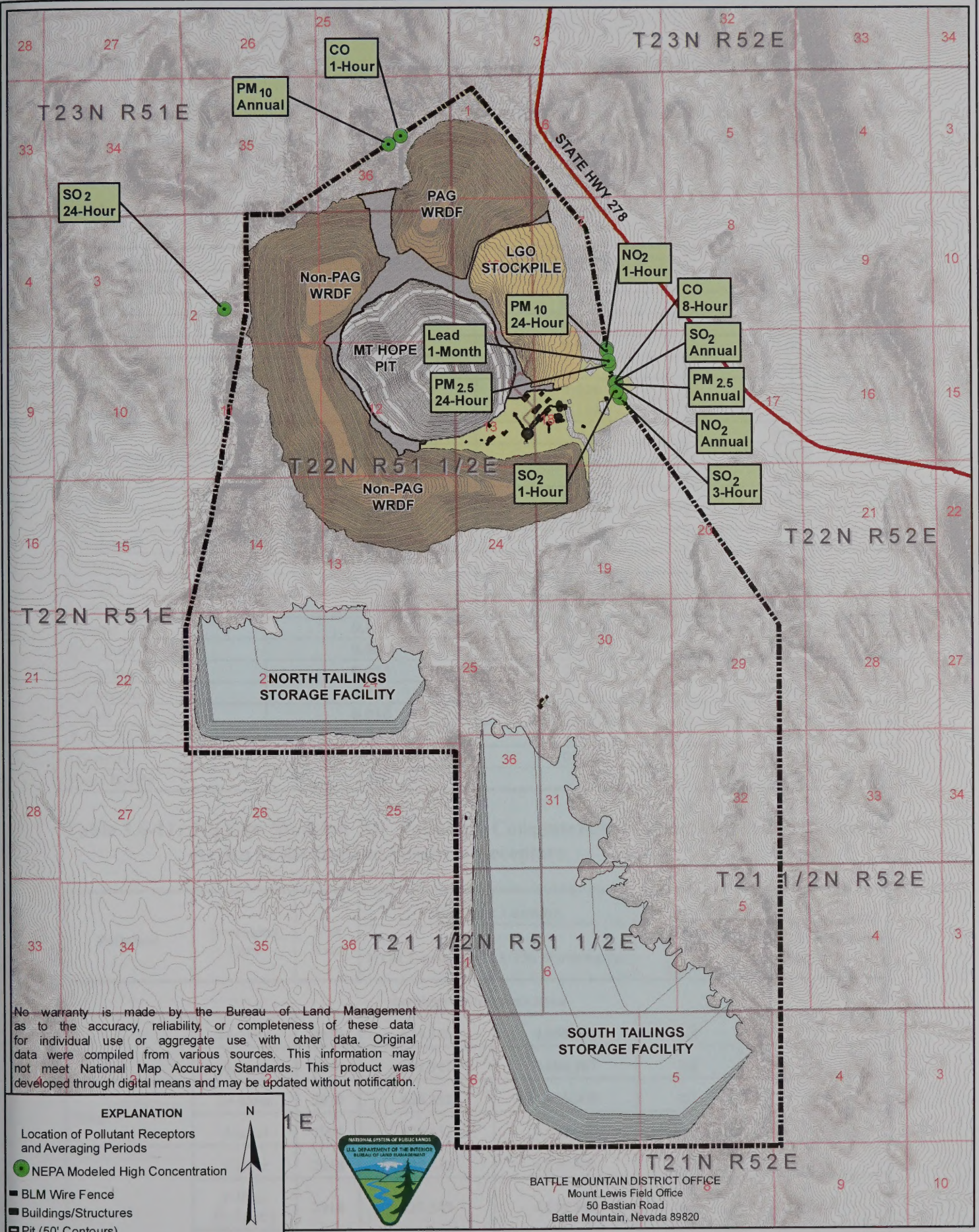
HAPs emissions from the Proposed Action would result from the handling of earthen materials, the combustion of the hydrocarbon fuels, and the handling and use of various chemicals. A summary of the total HAPs emissions that would be emitted from the Proposed Action is presented in Table 3.6-10 (Air Sciences Inc. 2012b). The facility-wide HAPs emissions would be **4.53** tpy and Mn would be the highest emitted single HAP at 1.16 tpy. These estimated emissions include both fugitive and process sources. EPA thresholds for any single HAP, or for all HAPs combined, are ten and 25 tpy, respectively. With the exception of Pb, there are no ambient air quality standards for HAPs and these emissions would have an incremental impact on the air quality in the vicinity of the Project Area. Pb is a criteria pollutant, as mentioned previously in the text.

3.6.3.3.4 Sensitive Receptors Effects

Dispersion modeling was also performed to determine the impacts on the "sensitive" receptors listed in Section 3.6.3.2.2 for the NEPA analysis. The highest 24-hour PM_{10} impact from the Proposed Action on the defined sensitive receptors was found to be **14.3** $\mu g/ m^3$ at the Roberts Creek Ranch. The highest annual PM_{10} impact from the Proposed Action on the defined sensitive receptors was found to be 1.091 $\mu g/ m^3$, also at the Roberts Creek Ranch (Table 3.6-11).

The NEPA modeling analysis was also performed to determine the impacts of the gaseous pollutants from the Proposed Action on the defined sensitive receptors, including the Jarbidge Wilderness, for each applicable averaging time shown in Table 3.6-11. In all instances, the concentrations are a small fraction of the ambient standards, and in the case of the Jarbidge Wilderness, much less than the PSD Class I increments.

The highest 24-hour and annual PM_{10} concentrations modeled from the Proposed Action emissions at the Jarbidge Wilderness Area are 0.1 $\mu g/m^3$ and 0.008 $\mu g/m^3$, respectively. Although the Project is not subject to limitations by the PSD Class I increments (8 $\mu g/m^3$ and



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

EXPLANATION

Location of Pollutant Receptors and Averaging Periods

- NEPA Modeled High Concentration
- BLM Wire Fence
- Buildings/Structures
- Pit (50' Contours)
- Interpit Area
- Low Grade Ore Stockpile (25' Contours)
- Tailing Storage Facilities (20' Contours)
- Waste Rock Disposal Facilities (20' Contours)
- Yard

N

0 2,000 4,000 6,000 Feet

BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD
CHECKED: -	APPROVED: RFD	DATE: 08/02/2012

FILE NAME: p1635_Fig3-6-4_ModeledHighPollutants_v3.mxd

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Modeled Highest Pollutant Concentrations for the Proposed Action

Figure 3.6.4

4 g/m^3, 24-hour and annual averaging times, respectively), the ambient concentration increases modeled from Proposed Action emissions values are far below these PSD Class I increments and the EPA's modeling significance level of 1 µg/m^3.

Table 3.6-10: HAPs Emissions for the Mount Hope Project

HAPs	Facility Total (tpy)	Fugitive Sources (tpy)	Process Sources (tpy)
Formaldehyde	**0.074**	**0.056**	0.018
Benzene	**0.553**	**0.550**	0.003
Acetaldehyde	**0.018**	**0.018**	0.0003
Naphthalene	**0.093**	**0.092**	0.001
1,3-Butadiene	0.00001	--	0.00001
Acrolein	**0.006**	**0.006**	0.00005
Toluene	**0.201**	**0.199**	0.002
Hexane	0.415	--	0.415
Phosphorus as P2O5	**0.810**	**0.770**	**0.040**
Phosphorus	**0.011**	**--**	**0.011**
Xylenes	**0.137**	**0.137**	**0.001**
Lead	**0.265**	**0.243**	**0.022**
Manganese	**1.159**	**1.142**	**0.018**
Mercury	**0.001**	**0.001**	**0.0002**
Nickel	**0.038**	**0.037**	**0.001**
Antimony	**0.015**	**0.015**	**0.000**
Arsenic	**0.184**	**0.159**	**0.025**
Beryllium	**0.004**	**0.003**	**0.000**
Cadmium	**0.025**	**0.025**	**0.000**
Chromium	**0.267**	**0.262**	**0.005**
Cobalt	**0.010**	**0.010**	**0.000**
Hydrochloric Acid	0.241	--	0.241
Selenium	0.004	0.003	0.001
Total HAPs	**4.53**	**3.73**	**0.80**

Table 3.6-11: Highest Modeled Air Pollutant Concentration Impacts from the Proposed Action at the Defined Sensitive Receptors

Pollutant	Averaging Time	Met Year	Receptor Location		Dispersion Modeling Results (µg/m^3)	Lowest Applicable Ambient Standard (µg/m^3)
			UTM Easting (m)	UTM Northing (m)		
Jarbidge Wilderness Area						
$PM_{2.5}$	24-Hour	**2010**	**634,545**	**4,608,201**	**0.0**	35
	Annual	**2010**	**632,947**	**4,608,167**	**0.0**	15
PM_{10}	24-Hour	**2010**	**628,352**	**4,608,069**	**0.1**	4
	Annual	1991	628,652	4,608,076	0.008	8
CO	1-Hour	**2010**	**627,543**	**4,610,542**	**0.8**	40,000
	8-Hour (< 5,000')	**2010**	**627,543**	**4,610,542**	**0.2**	10,000
	8-Hour (≥ 5,000')	**2010**	**627,543**	**4,610,542**	**0.2**	6,670

Pollutant	Averaging Time	Met Year	Receptor Location		Dispersion Modeling Results ($\mu g/m^3$)	Lowest Applicable Ambient Standard ($\mu g/m^3$)
			UTM Easting (m)	UTM Northing (m)		
Pb	1-Month	**2010**	**628,352**	**4,608,069**	**0.0000**	1.5
NO_2	1-Hour	**2010**	**632,347**	**4,608,154**	**0.4**	188
	Annual	**2010**	**628,321**	**4,608,164**	**0.0**	2.5
SO_2	1-Hour	**2010**	**630,150**	**4,608,108**	**0.1**	196
	3-Hour	**2010**	**627,540**	**4,610,936**	**0.1**	25
	24-Hour	1991	628,652	4,608,076	0.076	5
	Annual	1991	628,652	4,608,076	0.001	2
Great Basin National Park						
$PM_{2.5}$	24-Hour	**2010**	**732,016**	**4,327,169**	**7.0**	35
	Annual	**2010**	**732,114**	**4,327,174**	**2.4**	15
PM_{10}	24-Hour	**2010**	**732,213**	**4,327,179**	**10.3**	150
	Annual	1991	732,016	4,327,170	0.007	50
CO	1-Hour	**2010**	**732,213**	**4,327,179**	**2.6**	40,000
	8-Hour (< 5,000')	**2010**	**732,213**	**4,327,179**	**0.4**	10,000
	8-Hour (≥ 5,000')	**2010**	**732,213**	**4,327,179**	**0.4**	6,670
Pb	1-Month	**2010**	**731,031**	**4,327,122**	**0.000**	1.5
NO_2	1-Hour	**2010**	**732,016**	**4,327,169**	**0.8**	188
	Annual	**2010**	**732,016**	**4,327,169**	**0.0**	100
SO_2	1-Hour	**2010**	**731,622**	**4,327,150**	**0.1**	196
	3-Hour	**2010**	**732,311**	**4,327,183**	**0.1**	1,300
	24-Hour	1988	728,953	4,320,711	0.042	365
	Annual	1991	732,016	4,327,170	0.001	80
Bailey North Ranch*						
$PM_{2.5}$	**24-Hour**	**2010**	**580,043**	**4,419,188**	**7.3**	**35**
	Annual	**2010**	**580.043**	**4.419.188**	**2.45**	**15**
PM_{10}	**24-Hour**	**2010**	**580,043**	**4,419,188**	**12.0**	**150**
CO	**1-Hour**	**2010**	**580,043**	**4,419,188**	**37.9**	**40,000**
	8-Hour (<5,000')	**2010**	**580,043**	**4,419,188**	**6.9**	**10,000**
	8-Hour (>5,000')	**2010**	**580,043**	**4,419,188**	**6.9**	**6,670**
Pb	**1-Month**	**2010**	**580,043**	**4,419,188**	**0.000**	**1.5**

Pollutant	Averaging Time	Met Year	Receptor Location		Dispersion Modeling Results ($\mu g/m^3$)	Lowest Applicable Ambient Standard ($\mu g/m^3$)
			UTM Easting (m)	UTM Northing (m)		
NO_2	1-Hour	2010	580,043	4,419,188	18.3	188
	Annual	2010	580,043	4,419,188	0.3	100
SO_2	1-Hour	2010	580,043	4,419,188	1.6	196
	3-Hour	2010	580,043	4,419,188	1.0	1,300
Bailey South Ranch*						
$PM_{2.5}$	24-Hour	2010	581,599	4,396,519	7.4	35
	Annual	2010	581,599	4,396,519	2.45	15
PM_{10}	24-Hour	2010	581,599	4,396,519	12.3	150
CO	1-Hour	2010	581,599	4,396,519	37.5	40,000
	8-Hour (<5,000')	2010	581,599	4,396,519	7.2	10,000
	8-Hour (>5,000')	2010	581,599	4,396,519	7.2	6,670
Pb	1-Month	2010	581,599	4,396,519	0.0000	1.5
NO_2	1-Hour	2010	581,599	4,396,519	21.7	188
	Annual	2010	581,599	4,396,519	0.4	100
SO_2	1-Hour	2010	581,599	4,396,519	2.4	196
	3-Hour	2010	581,599	4,396,519	1.5	1,300
Benson Ranch*						
$PM_{2.5}$	24-Hour	2010	584,817	4,396,554	7.3	35
	Annual	2010	584,817	4,396,554	2.45	15
PM_{10}	24-Hour	2010	584,817	4,396,554	11.7	150
CO	1-Hour	2010	584,817	4,396,554	27.1	40,000
	8-Hour (<5,000')	2010	584,817	4,396,554	5.8	10,000
	8-Hour (>5,000')	2010	584,817	4,396,554	5.8	6,670
Pb	1-Month	2010	584,817	4,396,554	0.000	1.5
NO_2	1-Hour	2010	584,817	4,396,554	15.8	188
	Annual	2010	584,817	4,396,554	0.3	100
SO_2	1-Hour	2010	584,817	4,396,554	1.5	196
	3-Hour	2010	584,817	4,396,554	0.7	1,300
Eureka County High School						
$PM_{2.5}$	24-Hour	2010	588,204	4,374,062	7.2	35

Pollutant	Averaging Time	Met Year	Receptor Location		Dispersion Modeling Results ($\mu g/m^3$)	Lowest Applicable Ambient Standard ($\mu g/m^3$)
			UTM Easting (m)	UTM Northing (m)		
	Annual	**2010**	588,204	4,374,062	**2.4**	15
PM_{10}	24-Hour	**2010**	588,204	4,374,062	**10.8**	150
	Annual	**1990**	588,204	4,374,062	**0.073**	50
CO	1-Hour	**2010**	588,204	4,374,062	**11.2**	40,000
	8-Hour (< 5,000')	**2010**	588,204	4,374,062	**1.9**	10,000
	8-Hour (≥ 5,000')	**2010**	588,204	4,374,062	**1.9**	6,670
Pb	1-Month	**2010**	588,204	4,374,062	**0.000**	1.5
NO_2	1-Hour	**2010**	588,204	4,374,062	**6.3**	188
	Annual	**2010**	588,204	4,374,062	**0.1**	100
SO_2	1-Hour	**2010**	588,204	4,374,062	**1.0**	196
	3-Hour	**2010**	588,204	4,374,062	**0.5**	1,300
	24-Hour	**1992**	588,204	4,374,062	**0.216**	365
	Annual	**1990**	588,204	4,374,062	**0.010**	80
Eureka Elementary School						
$PM_{2.5}$	24-Hour	**2010**	589,341	4,373,756	**7.2**	35
	Annual	**2010**	589,341	4,373,756	**2.4**	15
PM_{10}	24-Hour	**2010**	589,341	4,373,756	**10.9**	150
	Annual	**2010**	589,341	4,373,756	**0.075**	50
CO	1-Hour	**2010**	589,341	4,373,756	**9.2**	40,000
	8-Hour (< 5,000')	**2010**	589,341	4,373,756	**1.7**	10,000
	8-Hour (≥ 5,000')	**2010**	589,341	4,373,756	**1.7**	6,670
Pb	1-Month	**2010**	589,341	4,373,756	**0.000**	1.5
NO_2	1-Hour	**2010**	589,341	4,373,756	**6.6**	188
	Annual	**2010**	589,341	4,373,756	**0.1**	100
SO_2	1-Hour	**2010**	589,341	4,373,756	**0.7**	196
	3-Hour	**2010**	589,341	4,373,756	**0.4**	1,300
	24-Hour	**1992**	589,341	4,373,756	**0.174**	365
	Annual	**1990**	589,341	4,373,756	**0.010**	80
Eureka County Medical Clinic						
$PM_{2.5}$	24-Hour	**2010**	589,358	4,374,008	**7.2**	35

Pollutant	Averaging Time	Met Year	Receptor Location		Dispersion Modeling Results ($\mu g/m^3$)	Lowest Applicable Ambient Standard ($\mu g/m^3$)
			UTM Easting (m)	UTM Northing (m)		
	Annual	**2010**	589,358	4,374,008	**2.4**	15
PM_{10}	24-Hour	**2010**	589,358	4,374,008	**10.9**	150
	Annual	1990	589,358	4,374,008	**.076**	50
CO	1-Hour	**2010**	589,358	4,374,008	**9.1**	40,000
	8-Hour (< 5,000')	**2010**	589,358	4,374,008	**1.7**	10,000
	8-Hour (≥ 5,000')	**2010**	589,358	4,374,008	**1.7**	6,670
Pb	1-Month	**2010**	589,358	4,374,008	**0.000**	1.5
NO_2	1-Hour	**2010**	589,358	4,374,008	**6.7**	188
	Annual	**2010**	589,358	4,374,008	**0.1**	10
SO_2	1-Hour	**2010**	589,358	4,374,008	**0.7**	196
	3-Hour	**2010**	589,358	4,374,008	**0.4**	1,300
	24-Hour	1991	589,358	4,374,008	**0.182**	365
	Annual	1990	589,358	4,374,008	**0.011**	80
Alpha Ranch						
$PM_{2.5}$	24-Hour	**2010**	568,465	4,428,941	**7.4**	35
	Annual	**2010**	568,465	4,428,941	**2.4**	15
PM_{10}	24-Hour	**2010**	568,465	4,428,941	**12.0**	150
	Annual	1991	568,465	4,428,941	**.110**	50
CO	1-Hour	**2010**	568,465	4,428,941	**44.8**	40,000
	8-Hour (< 5,000')	**2010**	568,465	4,428,941	**6.1**	10,000
	8-Hour (≥ 5,000')	**2010**	568,465	4,428,941	**6.1**	6,670
Pb	1-Month	**2010**	568,465	4,428,941	**0.000**	1.5
NO_2	1-Hour	**2010**	568,465	4,428,941	**21.1**	188
	Annual	**2010**	568,465	4,428,941	**0.2**	100
SO_2	1-Hour	**2010**	568,465	4,428,941	**2.4**	196
	3-Hour	**2010**	568,465	4,428,941	**1.2**	1,300
	24-Hour	1989	568,465	4,428,941	**0.445**	365
	Annual	1991	568,465	4,428,941	**0.013**	80
Roberts Creek Ranch						
$PM_{2.5}$	24-Hour	**2010**	560,933	4,400,379	**7.9**	35

Pollutant	Averaging Time	Met Year	Receptor Location		Dispersion Modeling Results ($\mu g/m^3$)	Lowest Applicable Ambient Standard ($\mu g/m^3$)
			UTM Easting (m)	UTM Northing (m)		
	Annual	**2010**	560,933	4,400,379	**2.5**	15
PM_{10}	24-Hour	**2010**	560,933	4,400,379	**14.3**	150
	Annual	1991	560,933	4,400,388	**1.091**	50
CO	1-Hour	**2010**	560,933	4,400,379	**60.9**	40,000
	8-Hour (< 5,000')	**2010**	560,933	4,400,379	**11.0**	10,000
	8-Hour (≥ 5,000')	**2010**	560,933	4,400,379	**1.0**	6,670
Pb	1-Month	**2010**	560,933	4,400,379	**0.000**	1.5
NO_2	1-Hour	**2010**	560,933	4,400,379	**37.1**	188
	Annual	**2010**	560,933	4,400,379	**0.5**	100
SO_2	1-Hour	**2010**	560,933	4,400,379	**3.9**	196
	3-Hour	**2010**	560,933	4,400,379	**1.7**	1,300
	24-Hour	1991	560,933	4,400,379	**0.942**	365
	Annual	1991	560,933	4,400,379	**0.112**	80
Tonkin Reservoir						
$PM_{2.5}$	24-Hour	**2010**	550,030	4,418,098	**7.5**	35
	Annual	**2010**	550,030	4,418,098	**2.4**	15
PM_{10}	24-Hour	**2010**	550,030	4,418,098	**12.3**	150
	Annual	1988	550,030	4,418,098	**0.236**	50
CO	1-Hour	**2010**	550,030	4,419,098	**28.4**	40,000
	8-Hour (< 5,000')	**2010**	550,030	4,419,098	**6.5**	10,000
	8-Hour (≥ 5,000')	**2010**	550,030	4,419,098	**6.5**	6,670
Pb	1-Month	**2010**	550,030	4,419,098	**0.000**	1.5
NO_2	1-Hour	**2010**	550,030	4,419,098	**14.8**	188
	Annual	**2010**	550,030	4,419,098	**0.2**	100
SO_2	1-Hour	**2010**	550,030	4,419,098	**1.9**	196
	3-Hour	**2010**	550,030	4,419,098	**1.1**	1,300
	24-Hour	1989	550,030	4,419,098	**0.443**	365
	Annual	1988	550,030	4,419,098	**0.031**	80

*** New Sensitive Receptors**
[1] All coordinates in UTM projection, North American Datum 1983.
[2] Background values, as listed in Table 3.6-7 are included.

- **Impact 3.6.3.3-3:** The modeled PM_{10}, $PM_{2.5}$, Pb, CO, NO_2, SO_2, and O_3 from the Proposed Action emissions show a very small increase in these pollutants at the sensitive receptors.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.3.5 Climate Change Effects

The estimated fuel and electrical power consumption for the Proposed Action is provided in Table 3.6-12. In accordance with Nevada law, a portion of the electrical power consumed by EML would continue to come from renewable energy sources, increasing from 11 percent in 2009 to 15 percent in 2013 and thereafter (Nevada State Legislature 2008).

Table 3.6-12: Proposed Action and Alternatives Fuel and Power Consumption and Greenhouse Gas Emissions

Energy Source	Years	Alternatives				
		Proposed Action	Partial Backfill	Off-Site Transfer of Ore Concentrate for Processing	Slower, Longer Project Alternative[5]	No Action
Diesel Fuel Consumption (gallons per year)	1 - 32	10,000,000	10,000,000	10,000,000	5,000,000	11,000
	33 - 44	1,157,750	9,697,750	1,157,750	578,875	0
	45 - 48.4[1]	0	8,540,000	0	0	0
Propane Consumption (gallons per year)	1 - 32	1,218,100	1,218,100	505,100	609,050	0
	33 - 44	618,200	618,200	256,400	309,100	0
	45 - 48.4[1]	0	0	0	0	0
Electricity Consumption (megawatt-hours per year)	1 - 32	454,500	454,500	441,600	227,250	0
	33 - 44	444,200[2]	444,200[2]	437,800[3]	222,100	0
	45 - 48.4	17,520	17,520	17,520	8,760	0
Greenhouse Gas Emissions[4] (tons CO_2 per year)	1 - 32	604,251	604,251	586,069	302,125.5	124
	33 - 44	489,581	586,125	480,510	244,790.5	0
	45 - 48.4[1]	18,641	115,186	18,641	9,320.5	0

Source: EML 2009b.

1 - From year 32 to year 49 it would take approximately 16.4 years to complete the partial backfilling of the open pit under the Partial Backfill Alternative.

2 - Power requirements for the mill roaster, wells, and tailings (no electric shovels or drills are required for remining of the LGO Stockpile and waste rock dumps.

3 - Power requirements for the mill, concentrate leaching and drying, wells, and tailings (excludes to roaster)

4 - Emissions based on EPA AP-42 (EPA 2009) and Department of Energy (DOE) (DOE 2000) data.

5 - Although the lower mining and processing rates are inherently less fuel efficient, on a production unit basis, the precise energy consumption amounts cannot be determined without redesigning the mining fleet and processing facility. Therefore, for the purposes of this analysis, it is assumed that the Slower, Longer Project Alternative would consume half the energy for twice the duration relative to the Proposed Action.

Recent publications in the scientific literature suggest there is a direct correlation between global warming and emissions of GHG (IPCC 2007b). Other recent publications in the scientific literature suggest the correlation is not evident (Singer and Avery 2008; Spencer 2008; Soloman 2008). GHGs include CO_2, methane, NO_X, and O_3. GHGs also include water vapor, although a dominant GHG it is generally not considered in GHG calculations. Although many of

these gases occur naturally in the atmosphere, man-made sources substantially have increased the emissions of GHGs over the past several decades. Of the man-made GHGs, the greatest contribution currently comes from CO_2 emissions.

GHG emissions associated with the proposed Project primarily would be associated with the consumption of energy for mining and ore processing over the 44-year mine life. Operations that would contribute to GHG emissions would include the following:

- Fuel consumption (vehicles and machinery);
- Electricity consumption (machinery, milling, heap leach water circulation, ground water pumping and dewatering); **and**
- Diesel fuel combustion during the roasting of the ore concentrate (diesel is used as a flotation agent and may be carried through the process).

The current national annual emissions of GHGs are approximately eight billion tons (EPA 2008b). Under the Proposed Action, the Project would emit up to approximately 604 thousand tpy of GHGs, or approximately 0.00755 percent of the national annual emissions.

Existing climate prediction models, **which use GHG emissions as input values** for the **analysis and** prediction of climate change, are global in nature; therefore, they are not at the appropriate scale to estimate potential impacts **on** climate change **as a result of** the Proposed Action.

3.6.3.3.6 Residual Effects

The residual effects of the Proposed Action include point source and fugitive PM_{10}, $PM_{2.5}$, and Pb emissions from vehicular traffic, blasting, and material handling and processing operations. Other impacts include combustion emissions of PM_{10}, $PM_{2.5}$, CO, NO_2, SO_2, and VOC generated by numerous processes as a result of the Proposed Action, including combustion emissions from diesel engines, and burning propane, fuel oil, or diesel in various process equipments. These effects would cease once the Project ceases and there are no irreversible or irretrievable effects for the Proposed Action on air resources.

3.6.3.4 No Action Alternative

Under the No Action Alternative, air quality impacts associated with the Project would not occur. EMI would not be authorized to develop the Project and mine the ore body as described in the Proposed Action. However, the currently authorized exploration in the Project Area could continue, which would result in fugitive dust emissions and combustion emissions.

3.6.3.4.1 PM_{10}, $PM_{2.5}$, and Pb Emissions and Modeled Concentrations

The major sources of PM_{10}, $PM_{2.5}$, and Pb emissions from the No Action Alternative include resuspension of unpaved road dust from trucks and emissions from drill operations. Emission controls such as road watering would help minimize these emissions.

- **Impact 3.6.3.4-1:** Emissions of PM_{10}, $PM_{2.5}$, and Pb would be generated by the No Action Alternative in an amount substantially less than under the Proposed Action. The modeled PM_{10}, $PM_{2.5}$, and Pb concentrations under the Proposed Action support the

conclusion that these concentrations under the No Action Alternative would be below the NSAAQS and NAAQS, even with the addition of the background values.

Significance of the Impact: This impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.4.2 Combustion Emissions

Combustion of diesel in the trucks and drilling rigs can produce elevated ambient levels of CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and O_3. The amount of these emissions under the No Action Alternative would be substantially less than under the Proposed Action. Despite the lack of tailpipe emissions control technology for combustion sources throughout the Project Area, the maximum modeled CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and O_3 concentrations from both models for the Proposed Action would be well below either the NSAAQS or the NAAQS, and, therefore, the concentrations under the No Action alternative would also be less than the NSAAQS and the NAAQS.

- **Impact 3.6.3.4-2:** Combustion emissions of CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and VOC would be generated by the No Action Alternative in amounts that would be substantially less than under the Proposed Action. The modeled CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and O_3 concentrations under the Proposed Action support the conclusion that these concentrations under the No Action Alternative would be below the NSAAQS and NAAQS, even with the addition of the background values.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.4.3 HAPs Emissions

The major sources of HAPs emissions from the No Action Alternative include resuspension of unpaved road dust, which contain HAP metals, from trucks and combustion emissions from drill operations. Emission controls such as road watering would help minimize these emissions.

3.6.3.4.4 Sensitive Receptors Effects

Dispersion modeling for the Proposed Action was also performed to determine the impacts on the "sensitive" receptors listed in Section 3.6.3.2.2 for the NEPA analysis. The highest 24-hour PM_{10} impact from the Proposed Action on the defined sensitive receptors was found to be **14.3** $\mu g/m^3$ at the Roberts Creek Ranch. The highest annual PM_{10} impact from the Proposed Action on the defined sensitive receptors was found to be 1.091 $\mu g/m^3$, also at the Roberts Creek Ranch; therefore, any potential impacts from the No Action Alternative would be less than those identified for the Proposed Action.

The NEPA modeling analysis was also performed for the Proposed Action to determine the impacts of the gaseous pollutants from the Proposed Action on the defined sensitive receptors,

including the Jarbidge Wilderness. In all instances, the concentrations are a small fraction of the ambient standards, and in the case of the Jarbidge Wilderness, much less than the PSD Class I increments; therefore, any potential impacts from the No Action Alternative would be less than those identified for the Proposed Action.

- **Impact 3.6.3.4-3:** The emissions of PM_{10}, $PM_{2.5}$, Pb, CO, NO_2, SO_2, and O_3 from the No Action Alternative emissions may show a very small increase in these pollutants at the sensitive receptors and any potential impacts would be less than those under the Proposed Action.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.4.5 Climate Change Effects

The estimated fuel and electrical power consumption for the No Action Alternative is provided in Table 3.6-11. GHG emissions associated with the No Action Alternative primarily would be associated with the consumption of fuel (vehicles and machinery). The current national annual emissions of GHGs are approximately eight billion tons (EPA 2008b). Under the No Action Alternative, the Project would emit up to approximately 124 tpy of GHGs, or approximately 0.000001 percent of the national annual emissions.

Existing climate prediction models**, which use GHG emissions as input values** for the **analysis and** prediction of climate change**,** are global in nature; therefore, they are not at the appropriate scale to estimate potential impacts **on** climate change **as a result of** the No Action Alternative.

3.6.3.4.6 Residual Effects

The residual effects of the No Action Alternative include point source and fugitive PM_{10}, $PM_{2.5}$, and Pb emissions from vehicular traffic and drilling operations. Other impacts include combustion emissions of PM_{10}, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and VOC generated by vehicles and drill rigs as a result of the No Action Alternative, including combustion emissions from diesel and gasoline engines. These effects would cease once the activities under the No Action Alternative ceases and there are no irreversible or irretrievable effects for the No Action Alternative on air resources. The potential impacts would be adverse, but not irreversible.

3.6.3.5 Partial Backfill Alternative

The Partial Backfill Alternative would be the same as the Proposed Action, except that at the end of the mining in the open pit, the open pit would be partially backfilled to eliminate the potential for a pit lake. Backfilling would begin in Year 32 with an approximately 17-year time frame to complete the partial backfill process. The backfilling would be completed using 1.3 billion tons of Non-PAG waste rock from the Non-PAG WRDF. Emissions related to the backfilling process would be essentially the same as those from the mining process. A quantitative analysis was not completed because the modeling analysis for the Proposed Action, which looked at time periods from one hour to annual, sufficiently encompasses the potential impacts of the Partial Backfill

Alternative. The air quality impacts would occur over a longer period of time as compared to the Proposed Action.

3.6.3.5.1 PM_{10}, $PM_{2.5}$, and Pb Emissions

Activities under the Partial Backfill Alternative would be the same as under the Proposed Action through the completion of the mining operation. Therefore, the analysis of the potential air quality impacts for the Proposed Action appropriately characterize the potential air quality impacts for the Partial Backfill Alternative. In Year 32 of the mine life, backfilling would begin under the Partial Backfill Alternative, and approximately 1.3 billion tons of waste rock deposited at the Non-PAG WDRF would be transferred to the open pit to complete the partial backfilling of the waste rock mined under this alternative. The emissions associated with this activity are fugitive dust and combustion emissions associated with the loader transport and dumping of the waste rock. These emissions are a subset of the type and location of emissions evaluated for the placement of the waste rock under the analysis for the Proposed Action. Since the Proposed Action did not result in an identified exceedance of the NAAQS, activities under this portion of the Partial Backfill Alternative are also not expected to result in an exceedance of the NAAQS.

The $PM_{10}/PM_{2.5}$ emissions from the bus transportation of the employees on public roads to and from the Project Area would be similar to those of the Proposed Action, on an annual basis. However, the emissions would occur over a longer time period, due to the backfilling of the open pit. These emissions would have an incremental impact on the air quality in the vicinity of the transportation route.

The potential for indirect fugitive dust emissions from the ground water production in Kobeh Valley would be essentially the same as under the Proposed Action. These emissions would have an incremental impact on the air quality in the vicinity of the Kobeh Valley.

- **Impact 3.6.3.5-1:** The emissions of PM_{10}, $PM_{2.5}$, and Pb would be generated by numerous processes as a result of the Partial Backfill Alternative, including the resuspension of road dust, wind erosion of exposed dirt surfaces, and activities related to the processing of ore materials. These activities are inherent to the mining process and would be ongoing throughout the life of the Partial Backfill Alternative. Since this alternative is essentially the same as the Proposed Action, just longer in duration, the PM_{10}, $PM_{2.5}$, and Pb concentrations would be below the NSAAQS and NAAQS, even with the addition of the background values.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.5.2 Combustion Emissions

Combustion of diesel in the haul trucks and mobile equipment, such as loaders, dozers, etc., the combustion of propane in processing units such as boilers, and the combustion of fuel oil or diesel in units such as the roaster, can produce elevated ambient levels of CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and O_3 (from VOC emissions). In most cases, combustion emissions are generally uncontrolled for the emissions units. Despite the lack of tailpipe emissions control technology for

combustion sources throughout the Project Area, the maximum modeled CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and O_3 concentrations from both models are well below either the NSAAQS or the NAAQS. The modeled results, including background concentrations, for each pollutant for each applicable averaging time are shown in Table 3.6-9.

The CO, NO_2, SO_2, and VOC emissions from the bus transportation of the employees on public roads would be similar to those of the Proposed Action, on an annual basis. However, the emissions would occur over a longer time period, due to the backfilling of the open pit. These emissions would be from engine exhaust. These emissions would have an incremental impact on the air quality in the vicinity of the transportation route.

- **Impact 3.6.3.5-2:** Combustion emissions of CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and VOC would be generated by numerous processes as a result of the Partial Backfill Alternative, including combustion emissions from diesel engines and burning propane, fuel oil, or diesel in various process equipment. These emissions would be essentially the same as under the Proposed Action, except longer in duration. Therefore, the CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and O_3 concentrations would be below the NSAAQS and NAAQS.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.5.3 HAPs Emissions

HAPs emission rates from this alternative would be essentially the same as under the Proposed Action, on an annual basis. These emissions would result from the handling of earthen materials, the combustion of the hydrocarbon fuels, and the handling and use of various chemicals. However, the emissions would occur over a longer time period, due to the backfilling of the open pit. With the exception of Pb, there are no ambient air quality standards for HAPs and these emissions would have an incremental impact on the air quality in the vicinity of the Project Area. Pb is a criteria pollutant, as mentioned previously in the text.

3.6.3.5.4 Sensitive Receptors Impacts

Since the Partial Backfill Alternative is essentially the same as the Proposed Action, just longer in duration, the dispersion modeling that was performed for the Proposed Action to determine the impacts on the "sensitive" receptors listed in Section 3.6.3.2.2 is also representative of the Partial Backfill Alternative.

This same NEPA modeling analysis for the Proposed Action was performed to determine the impacts of the gaseous pollutants from the Project on the defined sensitive receptors, including the Jarbidge Wilderness, for each applicable averaging time shown in Table 3.6-10, and is representative of the Partial Backfill Alternative. In all instances, the concentrations are a small fraction of the ambient standards and, in the case of the Jarbidge Wilderness, are much less than the PSD Class I increments.

- **Impact 3.6.3.5-3:** The PM_{10}, $PM_{2.5}$, Pb, CO, NO_2, SO_2, and O_3 concentrations from the Partial Backfill Alternative would show a very small increase in these pollutants at the sensitive receptors.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.5.5 Climate Change Effects

The estimated fuel and electrical power consumption for the Partial Backfill Alternative is provided in Table 3.6-11. GHG emissions associated with the Partial Backfill Alternative primarily would be associated with the consumption of fuel (vehicles and machinery) and electricity. The current national annual emissions of GHGs are approximately eight billion tons (EPA 2008b). Under the Partial Backfill Alternative, the Project would emit up to approximately 604 thousand tpy of GHGs, or approximately 0.00755 percent of the national annual emissions.

Existing climate prediction models, **which use GHG emissions as inputs** for the **analysis and** prediction of climate change, are global in nature; therefore, they are not at the appropriate scale to estimate potential impacts **on** climate change **as a result of** the Partial Backfill Alternative.

3.6.3.5.6 Residual Effects

The residual adverse impacts of the Partial Backfill Alternative include fugitive PM_{10}, $PM_{2.5}$, and Pb emissions from vehicular traffic, blasting, and material handling and processing operations. Other impacts include combustion emissions of PM_{10}, $PM_{2.5}$, CO, NO_2, SO_2, and VOC generated by numerous processes as a result of the Partial Backfill Alternative, including combustion emissions from diesel engines and burning propane, fuel oil, or coal in various process equipments. These impacts would be adverse, but not irreversible.

3.6.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Activities under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be the same as the Proposed Action; however the ore processing facility would include only the milling operations of the molybdenum sulfide concentrate. The technical grade Mo oxide and FeMo portions of the processing facility would not be constructed. In addition, the leaching of the concentrate would likely not be done on site and the Mo sulfide would be shipped off site for processing. A quantitative analysis was not completed because the analysis for the Proposed Action sufficiently encompasses the potential impacts of the Off-Site Transfer of Ore Concentrate for Processing Alternative.

3.6.3.6.1 PM_{10}, $PM_{2.5}$, and Pb Emissions

Activities under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be the same as under the Proposed Action through the completion of the mining and milling operations, less the roaster and FeMo operations. The off-site transfer of the ore concentrate would still result in air quality impacts, but the roaster and FeMo operation impacts would occur at a different site. Therefore, the emissions in the Project Area under this alternative would be

reduced as compared to the Proposed Action. The roaster and FeMo operations emissions are a substantial portion of the "NEPA – Point and Process Fugitive Sources" emissions outlined in Table 3.6-3. Since the Proposed Action would not result in an identified exceedance of the NAAQS, activities under this portion of the Off-Site Transfer of Ore Concentrate for Processing Alternative would also not be expected to result in an exceedance of the NAAQS.

The $PM_{10}/PM_{2.5}$ emissions from the bus transportation of the employees on public roads to and from the Project Area would be similar, but perhaps slightly less, to those of the Proposed Action, on an annual basis, due to fewer employees. These emissions would have an incremental impact on the air quality in the vicinity of the transportation route.

The potential for indirect fugitive dust emission from the ground water production in Kobeh Valley would be essentially the same as under the Proposed Action. These emissions would have an incremental impact on the air quality in the vicinity of the Kobeh Valley.

- **Impact 3.6.3.6-1:** Emissions of PM_{10}, $PM_{2.5}$, and Pb would be generated by numerous processes as a result of the Off-Site Transfer of Ore Concentrate for Processing Alternative, including the resuspension of road dust, wind erosion of exposed dirt surfaces, and activities related to the processing of ore materials. These activities are inherent to the mining process and would be ongoing throughout the life of the Project. The PM_{10}, $PM_{2.5}$, and Pb concentrations would be below the NSAAQS and NAAQS, even with the addition of the background values.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.6.2 Combustion Emissions

Activities under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be the same as under the Proposed Action through the completion of the mining operation less the roasting and FeMo operations. The off-site transfer of the ore concentrate would still result in air quality impacts for roasting and FeMo operations, but these impacts would occur at a different site. Therefore, the emissions in the Project Area would be reduced and would be accounted for at the undetermined alternative processing location. These emissions are a subset of the type and location of emissions evaluated for the Proposed Action. Since the Proposed Action would not result in an identified exceedance of the NAAQS, activities under this portion of the Off-Site Transfer of Ore Concentrate for Processing Alternative would also not be expected to result in an exceedance of the NAAQS.

Combustion of diesel in the haul trucks and mobile equipment, such as loaders, dozers, etc., the haul of concentrate to an off-site processing facility, and the combustion of propane in processing units such as the boilers, can produce elevated ambient levels of CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and O_3. In most cases, combustion emissions are generally uncontrolled for the emissions units. Despite the lack of tailpipe emissions control technology for combustion sources throughout the Project Area, the maximum CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and O_3 concentrations would be below either the NSAAQS or the NAAQS. These emissions would be greater than under the Proposed Action, due to the off-site transfer of ore concentrate. However, there would

be a corresponding reduction in emissions due to the elimination in the roaster process under this alternative. The emissions from the off-site transfer of ore concentrate have not been quantified because the potential location for the transfer is not reasonably known.

The CO, NO_2, SO_2, and VOC emissions from the bus transportation of the employees on public roads would be similar, but perhaps slightly less, to those of the Proposed Action, on an annual basis, due to fewer employees. These emissions would be from engine exhaust. These emissions would have an incremental impact on the air quality in the vicinity of the transportation route.

- **Impact 3.6.3.6-2:** Combustion emissions of CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and VOC would be generated by numerous processes as a result of the Off-Site Transfer of Ore Concentrate for Processing Alternative, including combustion emissions from diesel engines, and burning propane, fuel oil, or diesel in various process equipments. The CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and O_3 concentrations would be below the NSAAQS and NAAQS.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.6.3 HAPs Emissions

HAPs emission rates from this alternative would be less than under the Proposed Action, on an annual basis because the roasting of the ore would not occur. These emissions would result from the handling of earthen materials, the combustion of the hydrocarbon fuels, and the handling and use of various chemicals. With the exception of Pb, there are no ambient air quality standards for HAPs and these emissions would have an incremental impact on the air quality in the vicinity of the Project Area. Pb is a criteria pollutant, as mentioned previously in the text.

3.6.3.6.4 Sensitive Receptors Impacts

Since the Off-Site Transfer of Ore Concentrate for Processing Alternative is essentially the same as the Proposed Action, just with lower emissions at the Project site only, the dispersion modeling that was performed for the Proposed Action to determine the impacts on the "sensitive" receptors listed in Section 3.6.3.2.2 is representative of the Off-Site Transfer of Ore Concentrate for Processing Alternative.

This same NEPA modeling analysis for the Proposed Action was performed to determine the impacts of the gaseous pollutants from the Project on the defined sensitive receptors, including the Jarbidge Wilderness, for each applicable averaging time shown in Table 3.6-10 and is representative of the Off-Site Transfer of Ore Concentrate for Processing Alternative. In all instances, the concentrations are a small fraction of the ambient standards, and in the case of the Jarbidge Wilderness, are much less than the PSD Class I increments.

- **Impact 3.6.3.6-3:** The PM_{10}, $PM_{2.5}$, Pb, CO, NO_2, SO_2, and VOC concentrations from the Off-Site Transfer of Ore Concentrate for Processing Alternative would show a very small increase in these pollutants at the sensitive receptors.

Significance of the Impact: This impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.6.5 Climate Change Effects

The estimated fuel and electrical power consumption for the Off-Site Transfer of Ore Concentrate for Processing Alternative is provided in Table 3.6-11. GHG emissions associated with the Off-Site Transfer of Ore Concentrate for Processing Alternative primarily would be associated with the consumption of fuel (vehicles and machinery) and electricity. The current national annual emissions of GHGs are approximately eight billion tons (EPA 2008b). Under the Off-Site Transfer of Ore Concentrate for Processing Alternative, the Project would emit up to approximately 586,069 tpy of GHGs, or approximately 0.0073 percent of the national annual emissions. These emissions would be greater than under the Proposed Action, due to the off-site transfer of ore concentrate. However, there would be a corresponding reduction in emissions due to the elimination in the roaster process under this alternative. The emissions from the off-site transfer of ore concentrate have not been quantified because the potential location for the transfer is not reasonably known.

Existing climate prediction models**, which use GHG emissions as inputs** for the **analysis and** prediction of climate change**,** are global in nature; therefore, they are not at the appropriate scale to estimate potential impacts **on** climate change **as a result of** the Off-Site Transfer of Ore Concentrate for Processing Alternative.

3.6.3.6.6 Residual Effects

The residual adverse impacts of the Off-Site Transfer of Ore Concentrate for Processing Alternative include fugitive PM_{10} and Pb emissions from vehicular traffic, blasting, and material handling on-site. Other impacts include combustion emissions of PM_{10}, $PM_{2.5}$, CO, NO_2, SO_2, and VOC generated by numerous processes as a result of the Off-Site Transfer of Ore Concentrate for Processing Alternative, including mostly combustion emissions from loading and hauling. These impacts would be adverse, but not irreversible.

3.6.3.7 Slower, Longer Project Alternative

Under the Slower, Longer Project Alternative, the Project would operate at approximately one-half the production rate as described in the Proposed Action, which would result in a project that would last approximately twice as long as the Proposed Action. Under this half-production rate alternative, the currently planned 96,000,000 st/y mining rate would be reduced to 48,000,000 st/y and the mill throughput would be reduced from 60,500 st/d of ore to 30,250 st/d.

The air dispersion model for the Project includes the parameters for the optimal design capacity of the equipment specified under the Proposed Action. The Proposed Action includes specific equipment for mining and milling and the operation of this equipment for 24 hours per day seven days per week at optimized throughput rates. Under the Slower, Longer Project Alternative, the mining and milling operation rates would be less than the Proposed Action. Therefore, the equipment that has been designed for the mining and milling under the Proposed Action could not be used and different equipment would need to be purchased.

A half-production Project has not been designed; however, for the sake of comparison, there are several facets of a half-production rate project that could be anticipated. Mining and processing equipment would be smaller, as would ancillary facilities (powerline supply and well field for example). The decreased size (and quantity) of mining and processing facilities and equipment would have decreased operational capacity, resulting in decreased emissions per time period (for example, per day, month or year). However, even though production would be half of the Proposed Action, it is expected that the emission reduction compared to the Proposed Action would be less than half (on a per-day or per-year basis). As a result, the Slower, Longer Project Alternative would create more emissions per ton processed than the Proposed Action. The smaller equipment that would be purchased may produce fewer emission (per day or year) than the larger equipment in the Proposed Action; however, work vehicles and smaller equipment types often tend to be less efficient and may therefore emit more per gallon or unit of energy output than larger models. Therefore, over the life of the Project under this alternative the total emissions would be greater than under the Proposed Action. Further, cutting the production in half does not cut the workforce traveling to the site in half (see Section 3.17.3 for further discussion). Rather, it is estimated that this Alternative would reduce the workforce by 30 percent compared to the Proposed Action. As a result, emissions from employee and contractor transportation to and from the Project Area would be decreased but not in proportion to the reduced production rate. Reagent consumption would be the same on a per-unit (of production) basis, but the smaller consumption rate would decrease storage requirements and material shipments.

3.6.3.7.1 PM_{10}, $PM_{2.5}$, and Pb Emissions

Since the Proposed Action did not result in an identified exceedance of the NAAQS, activities under the Slower, Longer Project Alternative would be smaller in magnitude and would therefore also not be expected to result in an exceedance of the NAAQS.

- **Impact 3.6.3.7-1:** The emissions of PM_{10}, $PM_{2.5}$, and Pb would be generated by essentially identical processes as discussed under the Proposed Action. However, the concentrations of these pollutants would be lower than modeled for the Proposed Action due to the halved production rate and decreased operating thresholds of smaller equipment and facilities. The resulting concentrations of PM_{10}, $PM_{2.5}$, and Pb would be lower than the Proposed Action which are below the NSAAQS and NAAQS.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.7.2 Combustion Emissions

The CO, NO_2, SO_2, and VOC emissions (and resulting O_3 formed by NO_x and VOC emissions) from the bus transportation of the employees on public roads would be similar to those of the Proposed Action, on an annual basis. However, the emissions would occur over a longer time period, due to the mine life being extended to approximately 88 years. These emissions would be from engine exhaust. These emissions would have an incremental impact on the air quality in the vicinity of the transportation route.

- **Impact 3.6.3.7-2:** Combustion emissions of CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and VOC (and resultant O_3 concentrations) would be generated by numerous processes as a result of the Slower, Longer Project Alternative, including combustion emissions from diesel engines and burning propane, fuel oil, or diesel in various process equipment. These emissions would be lower than the Proposed Action when examined on a daily, monthly or annual basis (according to the exposure time period the air quality standards are associated with). Therefore, the CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and O_3 concentrations would be below the NSAAQS and NAAQS.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.7.3 HAPs Emissions

HAPs emission rates from this alternative would be lower than as described under the Proposed Action. These emissions would result from the handling of earthen materials, the combustion of the hydrocarbon fuels, and the handling and use of various chemicals. However, the emissions per time period would be reduced and would occur over a longer time period. Although regulated by the EPA, with the exception of Pb, there are no ambient air quality standards for HAPs and these emissions would have a more dispersed incremental impact on the air quality in the vicinity of the Project Area than under the Proposed Action.

3.6.3.7.4 Sensitive Receptors Impacts

Since the Slower, Longer Project Alternative is essentially the same as the Proposed Action, just decreased operational rates and longer in duration, the dispersion modeling that was performed for the Proposed Action to determine the impacts on the "sensitive" receptors listed in Section 3.6.3.2.2 is a conservative representation of the Slower, Longer Project Alternative.

- **Impact 3.6.3.7-3:** The PM_{10}, $PM_{2.5}$, Pb, CO, NO_2, SO_2, and O_3 concentrations from the Slower, Longer Project Alternative would show a decrease in these pollutants at the sensitive receptors.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.6.3.7.5 Climate Change Effects

Power consumption and **GHG** emissions have not been calculated for the Slower, Longer Project Alternative. However, the usage of these energy sources and GHG emissions have been calculated for the Proposed Action, which is provided in Table 3.6-12. GHG emissions associated with the Slower, Longer Project Alternative would be similar, and possibly slightly greater than those under the Proposed Action over the life of the Project. However, hourly or daily emission rates would be lower due to the decreased scale of operations, although the duration would be doubled.

Existing climate prediction models, **which use GHG emissions as inputs** for the **analysis and** prediction of climate change, are global in nature; therefore, they are not at the appropriate scale to estimate potential impacts **on** climate change **from** the Slower, Longer Project Alternative.

3.6.3.7.6 Residual Effects

The residual adverse impacts of the Slower, Longer Project Alternative include fugitive PM_{10}, $PM_{2.5}$, and Pb emissions from vehicular traffic, blasting, and material handling and processing operations. Other impacts include combustion emissions of PM_{10}, $PM_{2.5}$,CO, NO_2, SO_2, and VOC (and resulting O_3 formation) generated by numerous processes as a result of the Slower, Longer Project Alternative, including combustion emissions from diesel engines and burning propane, fuel oil, or coal in various process equipment. These impacts would be less than under the Proposed Action.

3.7 Visual Resources

3.7.1 Regulatory Framework

Scenic quality is a measure of the visual appeal of a parcel of land. Section 102(a)(8) of FLPMA placed an emphasis on the protection of the quality of scenic resources on public lands. Section 101(b) of the NEPA of 1969 required that measures be taken to ensure that aesthetically pleasing surroundings be retained for all Americans.

To ensure that these objectives are met, the BLM devised the VRM System. The VRM system provides a means to identify visual values, establish objectives for managing these values, and provide information to evaluate the visual effects of proposed projects. The inventory of visual values combines evaluations of scenic quality, sensitivity levels, and distance zones to establish visual resource inventory classes, which are "informational in nature and provide the basis for considering visual values in the land use planning process. They do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities" (BLM 1986b).

VRM classes are typically assigned to public land units through the use of the visual resource inventory classes in the BLM's land use planning process. One of four VRM classes is assigned to each unit of public lands. The specific objectives of each VRM class are presented in Table 3.7-1.

Although there is a dark-sky movement whose goal is to reduce light pollution, there are no federal or State of Nevada regulations that regulate dark skies.

3.7.2 Affected Environment

3.7.2.1 Study Methods

Visual resources are characterized according to guidelines given in the Visual Resource Inventory Manual (BLM 1986b). The three primary components of the VRM system are scenic quality, visual sensitivity, and visual distance zones. Based on these three factors, land is placed into one of four visual resource inventory classes. The inventory classes rank the relative value of the visual resources and provide the basis for considering visual values in the RMP process.

The study area for visual resources is defined as the viewshed of the Project, or the area from which the Project can be seen (Figure 3.7.1). The viewshed includes parts of the Cortez Mountains and Simpson Park Range to the west, Toquima Range, Antelope Valley to the south, Diamond Mountains and a portion of the Ruby Mountains to the northeast, and an area south of Carlin to the north. Within this viewshed are large areas from which Mount Hope is not visible due to topography.

Table 3.7-1: BLM Visual Resource Management Classes

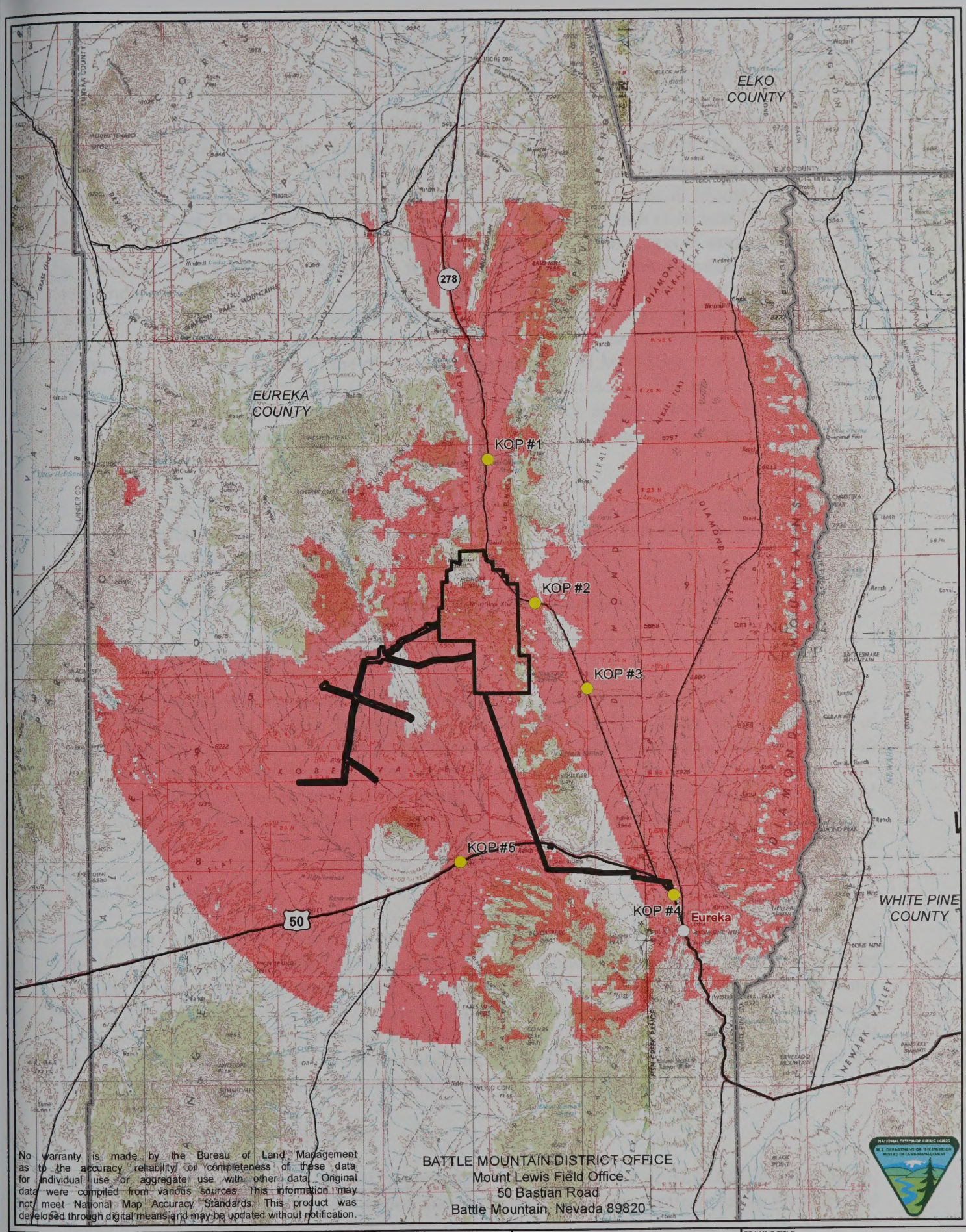
Class	Description
I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any change must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the character should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Source: BLM 1986b

3.7.2.2 Existing Conditions

The study area lies in the Great Basin Section of the Basin and Range Province of the US. The Great Basin Section is characterized by wide, flat to gently sloping basins bounded by isolated mountain ranges. These mountain ranges rise from 3,000 to 5,000 feet above the basins. While most of the mountain ranges tend to be elongated in a northeast direction, the proposed Project lies on the southeast flank of a conical mountain called Mount Hope. Mount Hope has an elevation of 8,411 feet amsl and is located between the Roberts Mountains to the northwest and the Whistler Range to the southeast. Mount Hope is located 1.5 miles west of SR 278 at Garden Pass approximately 23 miles north of the Town of Eureka, Nevada. The Project is located in an area that has been explored, prospected, and mined historically. Both historic and recent operations are visible on Mount Hope and include waste rock dumps, roads, drill pads and buildings.

Vegetation on Mount Hope is typical of the surrounding mountain ranges and consists of areas of piñon-juniper in the higher elevations and sagebrush in the lower elevations. Previous mining and exploration activities have occurred in the higher elevations and are visibly evident because the light colored cleared areas contrast with the darker piñon-juniper stands and darker weathered rock formations.



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

EXPLANATION

- Project Boundary
- Key Observation Points
- Viewshed

N

0 5 10 Miles

DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD	
CHECKED: _	APPROVED: RFD	DATE: 07/31/2012	
FILE NAME: p1635_Fig3-7-1_KOP&Viewshed.mxd			

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Top of Mount Hope Viewshed and Key Observation Points

Figure 3.7.1

The Mount Hope area was inventoried by the BLM for the Shoshone-Eureka Resource Management Plan as a combination of Visual Management Class **II,** III, and IV areas (BLM 1986a). **The visual classes in the vicinity of the Project Area are illustrated on Figure 3.7.2.** The BLM has mapped Class **II,** III, and Class IV **areas** at Mount Hope and the surrounding area. The Class III area includes the northeastern portion of Mount Hope as well as the area around SR 278 from Garden Pass to Diamond Valley. **The Class II area is located in a portion of the Project's powerline within the existing Falcon-Gondor corridor.** The remainder of the Project Area is in Class IV. Class IV is the least restrictive of the four management classes. A management activity in this class could draw attention as a dominant feature in the landscape, but attempts should be made to minimize the contrast by repeating the form, line, color, and texture of the characteristic landscape (BLM 1986a). In a Class III area the objective is to partially retain the existing character of the landscape. The level of change to the character should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Light pollution in the Mount Hope area is minimal and primarily limited to dispersed pinpoints of light associated with ranches. The Town of Eureka, 23 miles south of the Project Area, is the largest source of light pollution in the immediate area.

3.7.3 Environmental Consequences and Mitigation Measures

3.7.3.1 Significance Criteria

The assessment of visual impacts is based upon impact criteria and methodology described in the BLM Visual Contrast Rating System (BLM Manual Handbook, Section 8431-1). Effects to visual resources are assessed for the construction, operation, and closure of the Proposed Action and the alternatives. Quality of the visual environment is defined by the BLM VRM classes. Two issues, as follows, are addressed in determining impacts: a) the type and extent of actual physical contrast resulting from the Proposed Action and the alternatives, and b) the level of visibility of a facility, activity, or structure. These impacts would be considered significant if visual contrasts that result from landscape modifications are inconsistent with the changes allowed under the BLM VRM classification.

The extent to which the Proposed Action and the alternatives would affect the visual quality of the viewshed depends upon the amount of visual contrast created between the proposed facilities and the existing landscape elements (form, line, color, and texture) and features (land and water surface, vegetation, and structures). The magnitude of change relates to the contrast between each of the basic landscape elements and each of the features. Assessing the Proposed Action's or an alternative's contrast in this manner indicates the potential impacts and guides the development of mitigation measures that fulfill the VRM objectives.

3.7.3.2 Assessment Methodology

As discussed in Section 3.7.1, the BLM prescribes VRM classes for all BLM administered lands, including the area of the Proposed Action and alternatives. The visual effects of the facilities and operations of the Proposed Action were evaluated with respect to conformance with the established VRM Classes (**II,** III, and IV). The analysis was initiated through a Geographic Information System (GIS) viewshed analysis using a 25-mile radius of Mount Hope. Based on

this viewshed analysis and BLM and Eureka County input concerning Project visibility, five key observation points (KOPs) were chosen from routinely accessible vantage points from which the Project facilities may be visible. The viewshed and KOPs for the Project are shown on Figure 3.7.1.

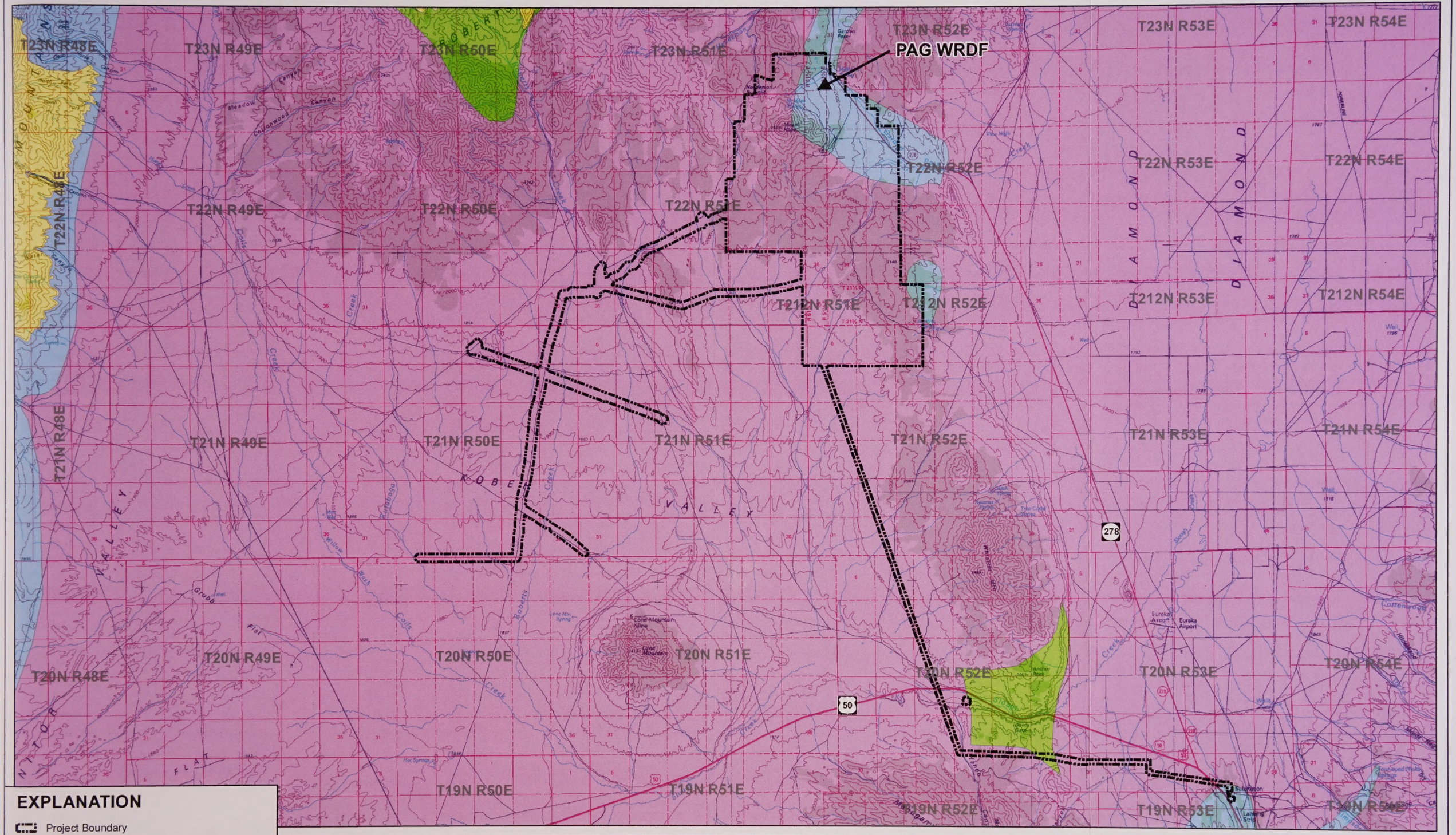
The process used to assess visual impacts is the BLM Contrast Rating Process, as outlined in BLM Technical Manual 8432, "Visual Contrast Rating." This is a systematic process that is used to identify, describe and analyze potential visual impacts of proposed projects and activities. VRM Form 8400-4 was prepared for each KOP. This process consists of first separating the existing landscape into major features, which include land/water, vegetation and structures. Then the landscape character elements, which include form, line, color and texture, are described for each feature. As is common throughout the Great Basin Physiographic region, views are open and expansive. Potentially sensitive viewing locations (places where people travel, recreate, or reside) were examined and from these, five KOPs were identified and evaluated. The VRM process was then conducted for the Project. The degree of contrast between the features and elements of the existing landscape and post-development landscape was then determined. The Visual Management Class for the Mount Hope area **are** either Class IV, where there can be strong contrasts between the existing landscape and post-development landscape, Class III, where there can be moderate contrast between the existing landscape and post-development landscape that does not dominate the view**, or Class II, where the level of change to the characteristic landscape should be very low and must not attract attention.** Contrast rating sheets that represent the No Action Alternative were prepared to analyze the Proposed Action and the alternatives. Photosimulations were then prepared that show maximum build out (Year 32 for KOPs 1 through 4 and Year 44 for KOP 5) fully reclaimed and the Partial Backfill Alternative fully reclaimed. The following sections describe these scenarios. For KOP #2 a Year 20 scenario was also developed to inform local residents and interested parties of the anticipated view at Year 20 (approximately half of the expected mine life) of the 44-year active Project.

3.7.3.2.1 KOP #1 - Nevada SR 278 Southbound

KOP #1 is located on SR 278 approximately six miles north of the Project Area. This KOP is located at the point where the Project Area is in the observers line-of-sight for an extended period of time when driving south on SR 278. Figures 3.7.**3** a, b, c, and d show the following: 1) the view of existing conditions (No Action Alternative) (Figure 3.7.**3**a); 2) a photosimulation of maximum build out at Year 32 (Figure 3.7.**3**b); 3) a photosimulation of the fully reclaimed Project (Figure 3.7.**3**c); and 4) a photosimulation of the Partial Backfill Alternative at final reclamation (Figure 3.7.**3**d).

Figure 3.7.**3**a is a photograph of the current conditions. The landscape consists of navy blue and mauve colored pyramidal shaped hills in the background with a predominantly tan, brown, and sage green colored flat foreground. There are bold diagonal lines in the background and moderate horizontal lines in the foreground. The most prominent structure visible is the existing road in the foreground that is a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the southbound observer's eyes to Mount Hope.

Figure 3.7.**3**b is a photosimulation showing maximum build out at Year 32. The landscape consists of a dark blue and mauve colored flat dome feature with light colored material on the top that represents the active WRDF. Mount Hope is a small pyramidal shape. The foreground is predominantly tan, brown, and sage green colored flat. There are bold primarily horizontal lines



EXPLANATION

- Project Boundary

Battle Mountain District VRM

- Class I
- Class II
- Class III
- Class IV

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

0 1 2 3 4 5 6 7 Miles

IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

DESIGN:	EMLLC	DRAWN:	GSL	REVIEWED:	RFD
CHECKED:	-	APPROVED:	RFD	DATE:	08/23/2012
FILE NAME:	p1635_Fig3-7-2_VRM.mxd				

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Visual Classes Within and Adjacent to the Project

Figure 3.7.2

and some diagonal lines in the background and moderate horizontal lines in the foreground. The most prominent structure visible is the existing road in the foreground that is a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the southbound observer's eyes to Mount Hope.

Figure 3.7.**3**c is a photosimulation showing the landscape as it would appear after mining and post reclamation. There would be a rounded trapezoidal shaped WRDF in the background. Vegetation on the lower portions of the WRDF would be more mature than the upper reaches but would likely blend in with the colors of the surrounding undisturbed areas because the vegetation types would be similar but less mature. The vegetation would be sparser and slightly lighter in color. Exposed ground surfaces would likely be lighter than surrounding undisturbed surfaces due to the different type of lighter colored rocks mined from the open pit.

Figure 3.7.**3**d is a photosimulation showing the fully reclaimed landscape as it would appear after mining and implementation of the Partial Backfill Alternative. The landscape consists of dark blue and mauve colored pyramidal shaped hills in the background with a predominantly tan, brown, and sage green colored flat foreground. There are bold diagonal lines in the background and moderate horizontal lines in the foreground. The most prominent structure visible is the existing road in the foreground that is a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the southbound observer's eyes to Mount Hope.

3.7.3.2.2 KOP #2 - Nevada SR 278 Northwestbound

KOP# 2 is located on SR 278 approximately four miles east southeast of the Project Area. This KOP is located at the point where the Project Area first becomes visible when traveling northbound on SR 278 where the highway turns westward between the Sulphur Range and the Whistler Range and where the majority of the public would first view the full visual effect of the Project. Figures 3.7.3 a, b, c, d, and e show the following: 1) the view of existing conditions (No Action Alternative) (Figure 3.7.**4**a); 2) a photosimulation of the Project build out at Year 20 (Figure 3.7.**4**b); 3) a photosimulation of maximum build out at Year 32 (Figure 3.7.**4**b); 4) a photosimulation of the fully reclaimed Project (Figure 3.7.**4**d); and 5) a photosimulation of the Partial Backfill Alternative (Figure 3.7.**4**e).

Figure 3.7.**4**a is a photograph of the current conditions. The existing landscape consists of a dark blue, mauve, and tan pink colored pyramidal hill in the background and yellow brown and sage green colored flat foreground. There are bold diagonal lines in the background and weak horizontal lines in the foreground. Drill roads in the background are readily evident from KOP #2 because of their horizontal lines and light tan to pink color contrasts with the diagonal lines and blue green color of the background. The existing highway in the foreground is a prominent structure in the foreground. The highway leads the observers eyes to Mount Hope, and its lines and color strongly contrast with those of other foreground features.

Figure 3.7.**4**b is a photosimulation showing build out at Year 20. The landscape consists of Mount Hope, a white pyramidal feature near the center, flanked on the west side by a smooth grey green flat feature (reclaimed) and on the east side a flat trapezoidal feature with light colored material on the top that represents the active PAG WRDF. The middleground shows a tan ovoid shape that is primarily white to gray in color with strong horizontal features that dominate the landscape. The foreground is flat and predominantly tan to yellow brown, sage, and medium green colored. There are bold primarily horizontal lines and some diagonal lines in the

background and middleground and weak horizontal lines in the foreground. The most prominent structure visible in the foreground is the existing road that is a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the northbound observer's eyes to Mount Hope and the LGO Stockpile.

Figure 3.7.4c is a photosimulation showing maximum build out at Year 32. The landscape consists of Mount Hope, a white pyramidal feature near the center, flanked on the west side by a smooth grey green flat feature (reclaimed) and on the east side a flat trapezoidal feature with light colored material on the top that represents the active PAG WRDF. The middleground shows a tan ovoid shape that is primarily white to gray in color with strong horizontal features that dominate the landscape. The foreground is flat and predominantly tan to yellow brown, sage, and medium green colored. There are bold primarily horizontal lines and some diagonal lines in the background and middleground and weak horizontal lines in the foreground. The most prominent structure visible in the foreground is the existing road that is a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the southbound observer's eyes to Mount Hope and the LGO Stockpile.

Figure 3.7.4d is a photosimulation showing the landscape as it would appear after mining and post-reclamation. A light colored pit highwall and WRDFs would be prominent in the background. The post-mining landscape would be changed from predominantly pyramidal shaped features in the background to rolling features. The WRDFs would be light colored versus the brown and dark green colored existing background. There would still be bold horizontal and diagonal lines. The most prominent structure visible is the existing road in the foreground, a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the southbound observer's eyes to Mount Hope.

Figure 3.7.4e is a photosimulation showing the fully reclaimed landscape as it would appear after mining and implementation of the Partial Backfill Alternative. The landscape consists of dark to light blue and white snow covered pyramidal shaped hills in the background. The middleground is dark blue to mauve with a light colored pyramidal and horizontal highwall shape that also shows some of the undisturbed portions of Mount Hope. The flat foreground is predominantly tan, brown, sage, and medium green colored. There are bold diagonal lines in the middleground and moderate horizontal lines in the foreground. The most prominent structure visible is the existing road in the foreground, a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the southbound observer's eyes to Mount Hope.

3.7.3.2.3 KOP #3 - Nevada SR 278 Northbound

KOP #3 is located at the intersection of 11th Street and SR 278 approximately six miles southeast of the Project Area. This KOP is located at the point where the Project Area is visible from ranches located east and southeast of SR 278. Figures 3.7.4 a, b, c, and d show the following: 1) the view of existing conditions (No Action Alternative) (Figure 3.7.5a); 2) a photosimulation of Year 44 (Figure 3.7.5b); 3) a photosimulation of the fully reclaimed Project (Figure 3.7.5c); and 4) a photosimulation of the Partial Backfill Alternative (Figure 3.7.5d).

Figure 3.7.5a is a photograph of the current conditions. The landscape consists of medium blue and mauve colored pyramidal and rolling hills in the background with some white snow capped mountains in the far background. The middleground is flat and is light yellow, brown, and sage green colored. The foreground is grey pavement and gravel. The background has bold diagonal

lines and weaker horizontal lines. The middleground has horizontal lines. Drill roads in the background are moderately evident from the KOP because of their horizontal lines and tan pink color contrasts with the diagonal lines and blue color of the background. The existing highway in the foreground is a prominent structure. The highway cuts across the foreground; however, the contrasts are minimized by the close proximity of the road to the observer and the horizontal line of the road.

Figure 3.7.**5**b is a photosimulation showing maximum build out at Year 32 with active upper WRDFs. The landscape consists of white snow capped blue mountains in the far background. There is a light colored pyramidal form (Mount Hope) flanked on each side by flat dark blue green forms topped by lighter colored material from WRDFs in the closer background. The middleground is flat and is light yellow, brown, and sage green colored. The foreground is grey pavement and gravel. The background has bold horizontal and moderate diagonal lines. The middleground has horizontal lines. The existing highway in the foreground is a prominent structure. The highway cuts across the foreground; however, the contrasts are minimized by the close proximity of the road to the observer and the horizontal line of the road.

Figure 3.7.**5**c is a photosimulation showing the landscape as it would appear after mining and post-reclamation. A pit highwall and WRDFs would be prominent in the background. The post-mining landscape would be changed from predominantly pyramidal shapes in the background to flat/rectangular shapes. The color would change from grey colors to blue green after revegetation. The Project would add a bold horizontal line component to the background.

Figure 3.7.**5**d is a photosimulation showing the fully reclaimed landscape as it would appear after mining and implementation of the Partial Backfill Alternative. The landscape consists of white snow-capped blue mountains in the far background. A pit highwall would be prominent in the background along with medium blue and mauve colored rolling hills.

3.7.3.2.4 KOP #4 - Eureka County Fairgrounds

KOP #4 is located at the east end of the Eureka County Fairgrounds approximately 20 miles southeast of the Project Area. This KOP is located at a point where the public gathers and would be able to observe the Project Area off in the distance. Figures 3.7.5 a, b, c, and d show the following: 1) the view of existing conditions (No Action Alternative) (Figure 3.7.**6**a); 2) a photosimulation of Year 35 (Figure 3.7.**6**b); 3) a photosimulation of the fully reclaimed Project (Figure 3.7.**6**c); and 4) a photosimulation of the Partial Backfill Alternative (Figure 3.7.**6**d).

Figure 3.7.**6**a is a photograph of the current conditions. The landscape consists of white snow-capped blue colored mountains in the far background. The closer background landscape contains medium blue and mauve colored, pyramidal shaped features with bold diagonal lines. The middleground has a green hummocky irregular line. The foreground has light tan to pink features with horizontal and diagonal lines. The structures in the foreground include a pink colored road and parking area with bold horizontal lines; green colored fence with horizontal lines and vertical fence posts, and brown colored power poles with vertical lines.

Figure 3.7.**6**b is a photosimulation at maximum build out at Year 32, with active upper WRDFs. The landscape consists of white snow capped blue mountains in the far background. The closer background landscape contains a grey prominent pyramidal shaped form (pit highwall) flanked by medium blue and mauve colored features with bold diagonal lines. The middleground has a

green hummocky irregular line. The foreground has light tan to pink features with horizontal and diagonal lines. The structures in the foreground include a pink colored road and parking area with bold horizontal lines, green colored fence with horizontal lines and vertical fence posts, and brown colored power poles with vertical lines.

Figure 3.7.6c is a photosimulation showing the landscape as it would appear after mining and post-reclamation. A pit highwall would be prominent in the background. Contrasts between the existing conditions and the proposed Project would be minimized by the distance from the observation point. There would be a strong contrast in color between the existing blue to mauve color and the lighter color of the mined area.

Figure 3.7.6d is a photosimulation showing the fully reclaimed landscape as it would appear after mining and implementation of the Partial Backfill Alternative. This alternative would result in the same view as 3.7.5c except that the skyline angle on the east side of Mount Hope would be steeper because of the removal of the North WRDF.

3.7.3.2.5 KOP #5 – U.S. Highway 50

KOP #5 is located on U.S. Highway 50 at the intersection of Roberts Creek Ranch Road. This KOP is located at the point where the south side of the Project Area is prominently visible when traveling eastbound on U.S. Highway 50 and the Roberts Creek Ranch Road. The KOP is approximately 15 miles south of the Project Area. Figures 3.7.6 a, b, c, and d show the following: 1) the view of existing conditions (No Action Alternative) (Figure 3.7.7a); 2) a photosimulation of Year 44 (Figure 3.7.7b); 3) a photosimulation of the fully reclaimed Project (Figure 3.7.7c); and 4) a photosimulation of the Partial Backfill Alternative (Figure 3.7.7d).

Figure 3.7.7a is a photograph of the current conditions. The existing background landscape would consist of medium blue and mauve colored pyramidal forms, which have bold horizontal and diagonal lines. The middleground is flat with grey green and medium brown colors. The lines are horizontal. The foreground is flat with grey and sage green colors with weak horizontal lines and green hummocky blobs. The structures in the foreground are a tan colored parking area with a horizontal line and a brown colored fence with a horizontal line and strong vertical features.

Figure 3.7.7b is a photosimulation at maximum build out at Year 44 with the unreclaimed North TSF. The existing background landscape would consist of a mauve colored pyramidal form with a strong contrast between the lighter colored highwall and the medium blue rolling to angular hills on either side of Mount Hope, which have bold horizontal and diagonal lines. The middleground is flat with a strongly contrasting white narrow rectangular form near the center and a brown narrow rectangular form to the east. The lines are horizontal. The foreground is flat with grey and sage green colors with weak horizontal lines and green hummocky blobs. The structures in the foreground are a tan colored parking area with a horizontal line and a brown colored fence with a horizontal line and strong vertical features.

Figure 3.7.7c is a photosimulation showing the landscape as it would appear after mining and post-reclamation. The existing background landscape would consist of a medium blue colored pyramidal form with a strong contrast between the lighter colored highwall and the medium blue rolling to angular hills on either side of Mount Hope, which have bold horizontal and diagonal lines. The middleground view is flat with weakly contrasting brownish narrow rectangular

horizontal forms. The foreground view is flat with grey and sage green colors with weak horizontal lines and green hummocky blobs. The structures in the foreground are a tan colored parking area with a horizontal line and a brown colored fence with a horizontal line and strong vertical features.

Figure 3.7.7d is a photosimulation showing the fully reclaimed landscape as it would appear after mining and implementation of the Partial Backfill Alternative. This alternative would result in the same view as 3.7.6c except that more of the lighter colored pit highwall would be visible because of the removal of the PAG WRDF.

3.7.3.3 Proposed Action

3.7.3.3.1 KOP Effects

The primary visual resources issues would include the following: 1) the development of a viewshed that could be seen from multiple sites and is substantially different than the existing viewshed; and 2) the ultimate appearance of the Project at full reclamation.

The results of the contrast rating assessment for KOP #1 indicate that there would be moderate contrast in the form, line and color between the existing landscape and the post-mining/post-reclamation background landscape. Excluding the open pit, any color contrast would be naturally mitigated after revegetation of the dump and after the vegetation matures. The changes, as described and viewed from KOP #1, would conform with the area's Visual Class III and IV designations.

The results of the contrast rating assessment for KOP #2 found that there would be a strong contrast in the form and color between the existing landscape and the post-mining/post-reclamation landscape. Except for the open pit area, the color contrast would be mitigated after revegetation of the dumps and after the vegetation matures. The open pit area would still be visible from the KOP even when the Proposed Action is fully reclaimed and would have a sustained substantial contrast to the surrounding reclaimed facilities and undisturbed topography. Since the view from this portion of the Project Area has a Class III designation the changes would not conform to the VRM objectives for the area.

The results of the contrast rating assessment for KOP #3 found that there would be a strong contrast in form, line and color between the existing landscape and the post-mining landscape. The color contrast should mitigate over time as the vegetation on the waste rock dumps matures to include more shrubs and trees. Within this distance zone, particularly during midday light conditions, color, form, and line contrasts created by the Proposed Action would be evident. Given the distance and visual aspect of the Project, the changes in the landscape conform to the VRM objectives for the area, which is Class III or IV, depending on which portion of the Project Area is viewed.

The results of the contrast rating assessment for KOP #4 found that there would be a strong contrast in the color of the land and vegetation. The color contrast should mitigate over time as the vegetation on the waste rock dumps matures to include more shrubs and trees. Within this distance zone, particularly during midday light conditions, color, form, and line contrasts created by the Proposed Action would be evident. Given the distance and visual aspect of the Project, the

changes in the landscape conform to the VRM objectives for the area, which are Class III or IV, depending on which portion of the Project is viewed.

The results of the contrast rating assessment for KOP #5 found that there would be a strong contrast in the color of the land, vegetation and structures. The color contrast should mitigate over time as the vegetation on the waste rock dumps and tailings matures to include more shrubs and trees. Within this distance zone, particularly during midday light conditions, color, form, and line contrasts created by the Proposed Action would be evident. The changes in the landscape conform to the VRM objectives for the area, which is Class IV.

Visual contrast would be reduced by reclamation practices, which would consist of recontouring and revegetating the WRDFs and the TSFs facility slopes; recontouring and revegetating exploration roads; and removing all buildings, structures, and equipment brought to the site, before recontouring and revegetation of all building sites. Following successful reclamation, the visual contrast of the Proposed Action would be slightly reduced. The use of surrounding landscape colors and native plant materials are appropriate means of reducing visual contrast. Over the long term, natural vegetation would begin to blend with the color and texture of the existing natural landscape. Although recontouring and revegetation of the disposal and heap leach/tailings areas would help to reduce the color and form contrasts, the scale of visual disturbance of these modified pyramidal landforms would remain visually evident. Buildings associated with the Proposed Action could draw the viewer's eye due to the color and form during mining and processing operations. The Proposed Action would not otherwise impact visual resources.

- **Impact 3.7.3.3-1:** The proposed mining activities would be visible from all five KOPs. The visual impacts would be consistent with VRM Class IV management at KOPs #1, #3, #4, and #5. From KOP #2, which is the only KOP where the Class III management area is visible, the view is not consistent with that management class.

  Significance of the Impact: This impact is considered significant because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.3-1:** For reducing visual contrast, minimization of disturbance would be the most effective mitigation technique. Where disturbance is proposed, repetition of the basic landscape elements (form, line, color, and texture) would be implemented to minimize visual change. **In order to lessen long-term visual impacts from the pit wall, treatment may be required to ensure that the final pit wall mimics the surrounding landscape colors as visible from KOP #2. Methods could include, but are not limited to, painting, staining, varnishing, or some other treatment that minimizes the contrast of the visibly exposed and unweathered rock of the pit wall. Any mitigation applications must be pH neutral and contain no caustic or alkaline chemicals to avoid potential adverse environmental impacts. Treatment may occur when the pit wall reaches its final slope configuration. The need for this treatment would be determined by the BLM at that time based on the color of the exposed pit wall surface and its contrast with the surrounding landscape. Specific dimensions and areas of mitigation would be determined by the BLM, based on the actual color of the final pit wall.**

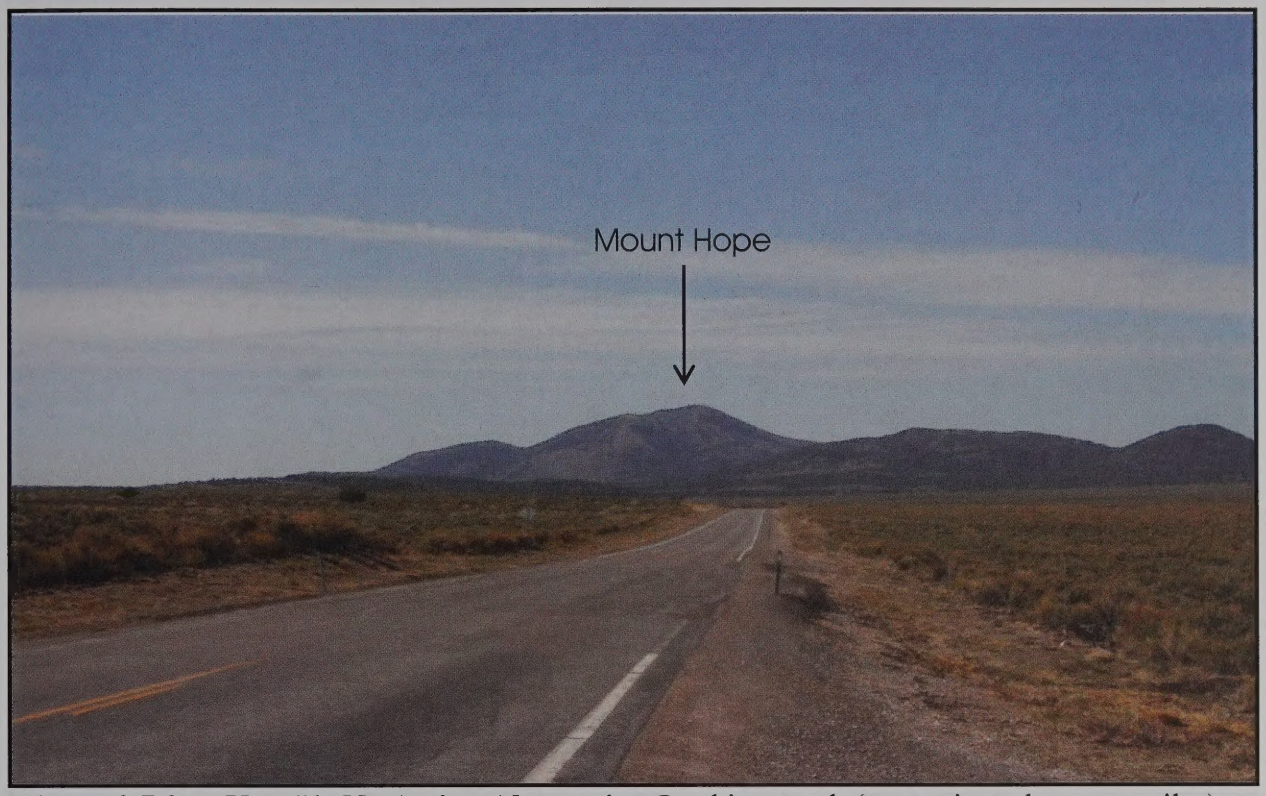


Figure 3.7.3a: Kop #1: No Action Alternative. Looking south (approximately seven miles) at Mount Hope from 0.2 miles south of mile marker #27 on State Highway 278.

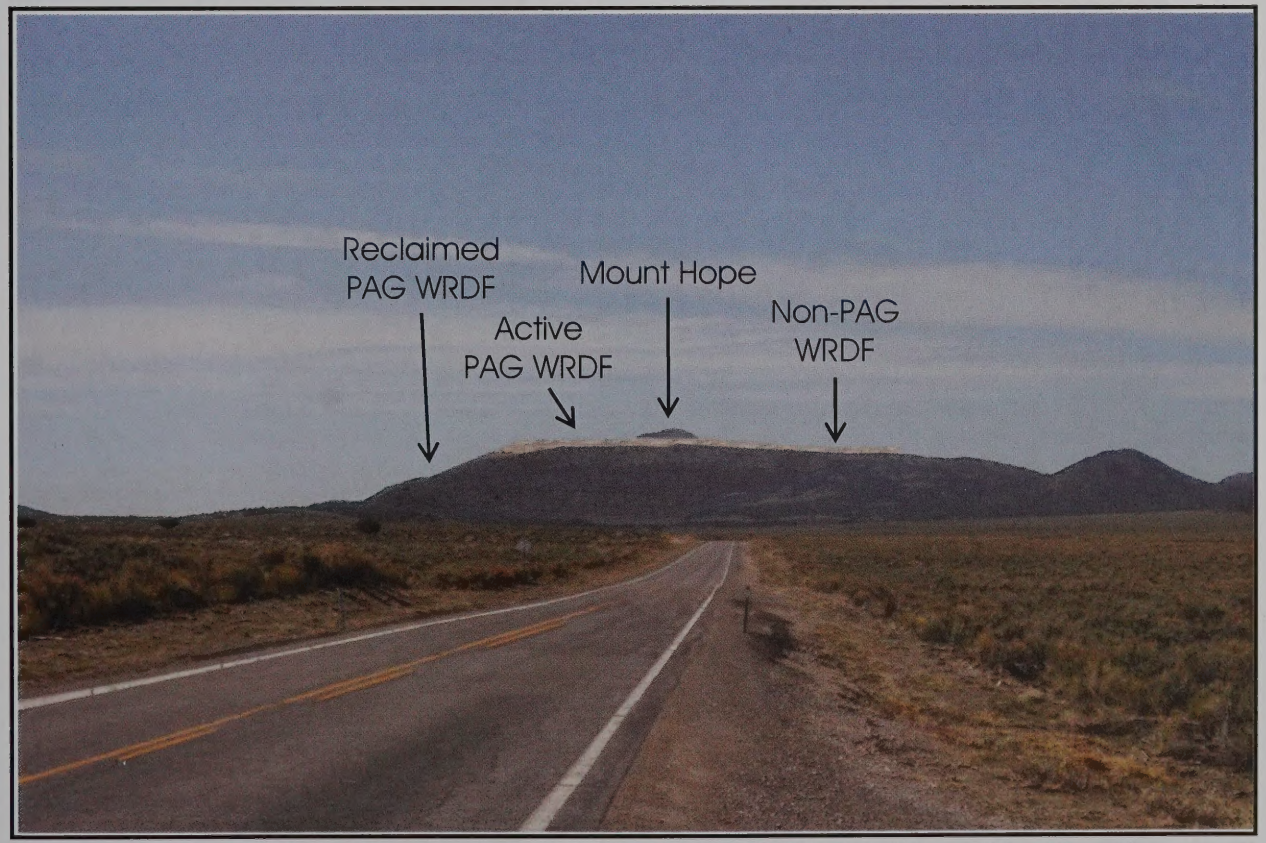


Figure 3.7.3b: KOP #1: Proposed Action Maximum Build Out (Year 32) with active upper WRDFs.

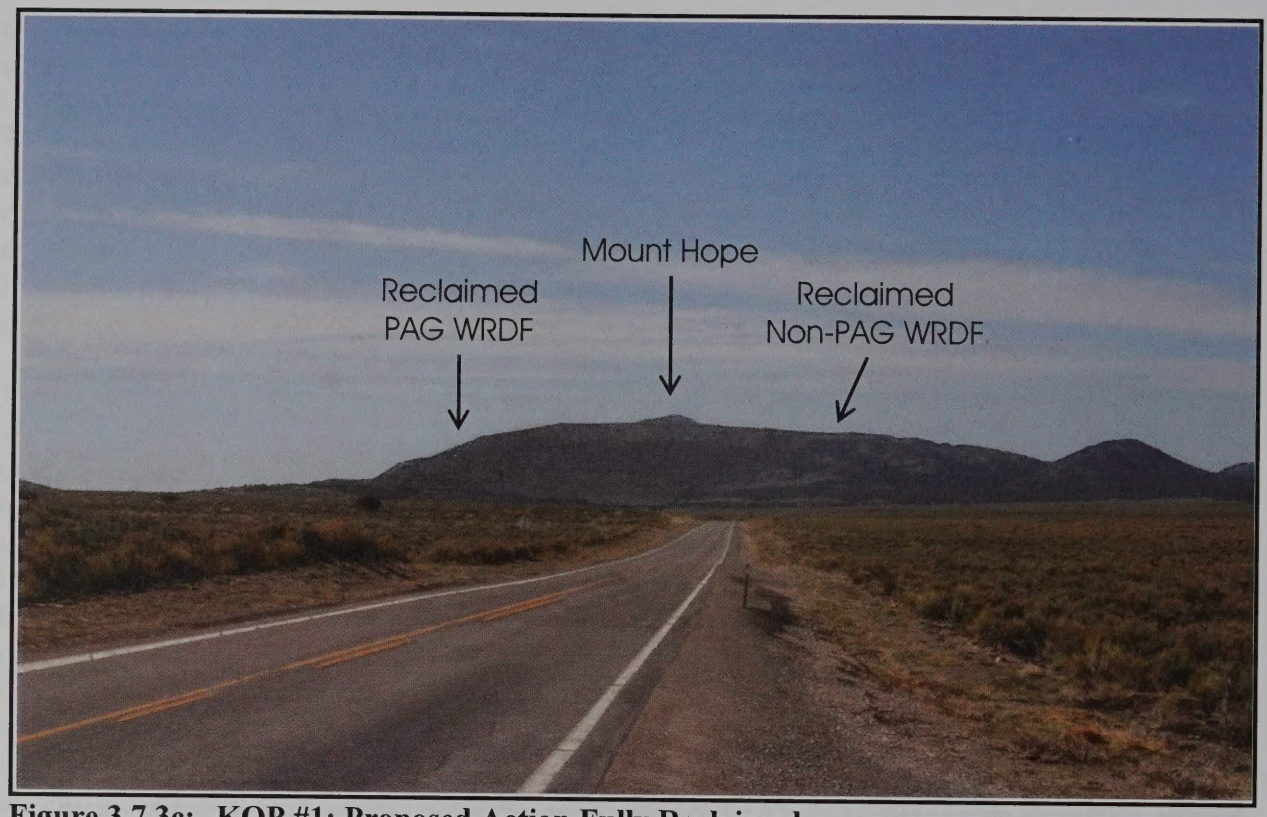


Figure 3.7.3c: KOP #1: Proposed Action Fully Reclaimed.

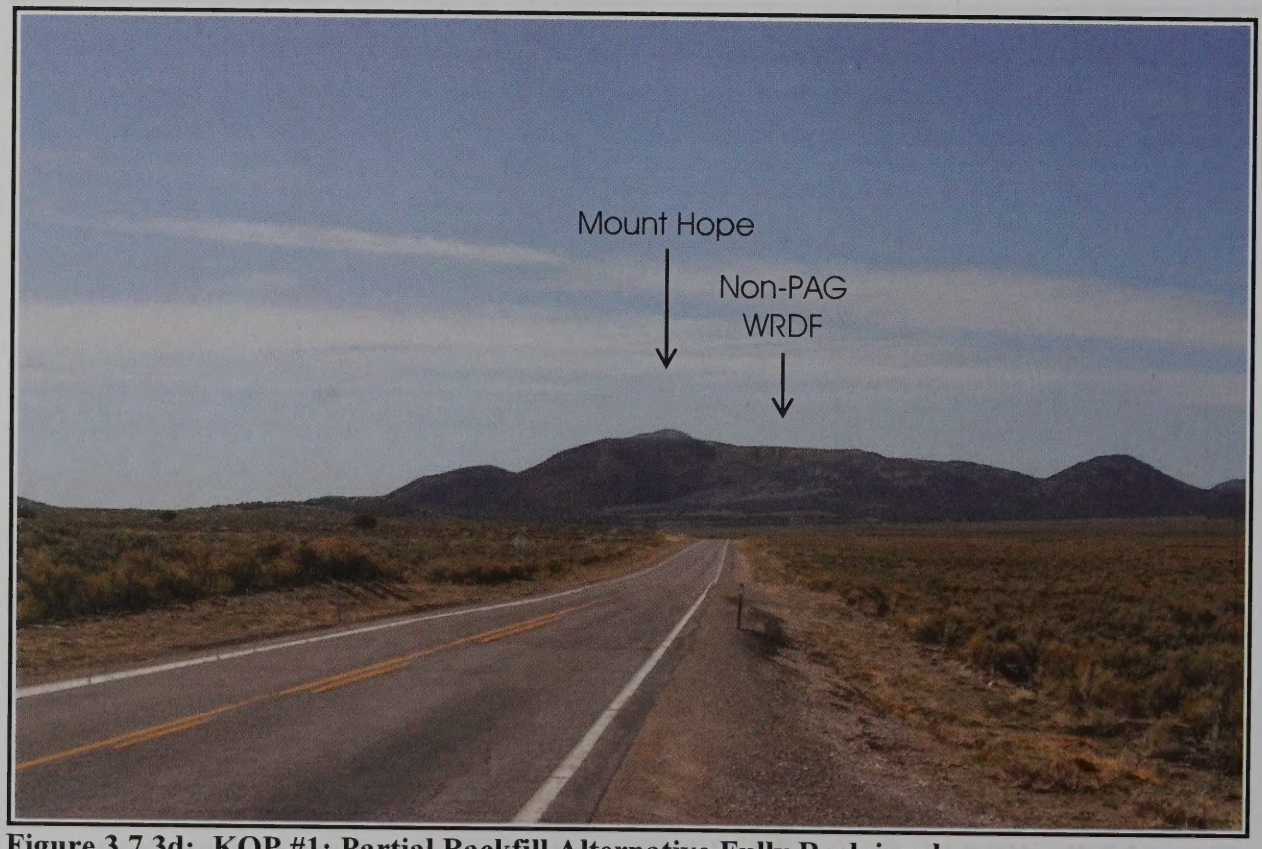


Figure 3.7.3d: KOP #1: Partial Backfill Alternative Fully Reclaimed.

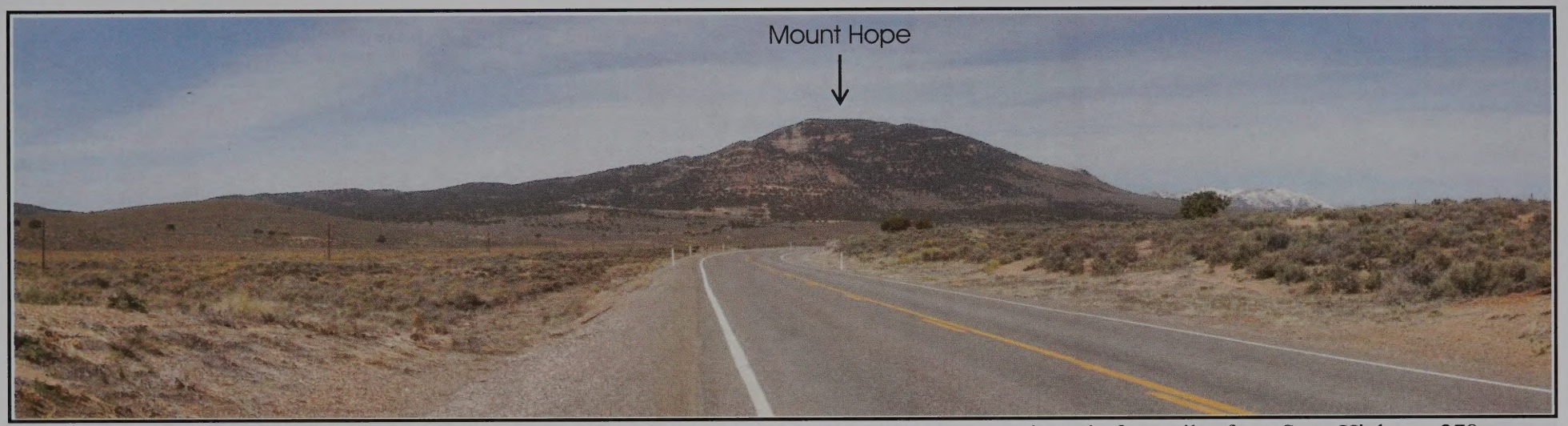


Figure 3.7.4a: KOP #2: No Action Alternative. Looking north-northwest at Mount Hope approximately four miles from State Highway 278.

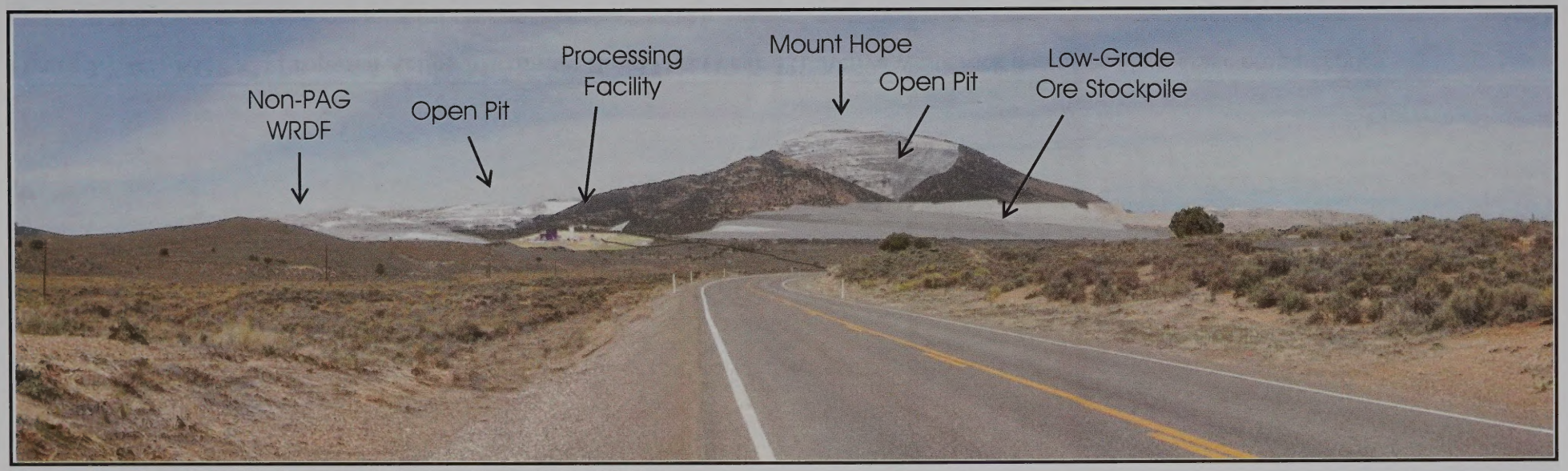


Figure 3.7.4b: KOP #2: Proposed Action Year 20 Build Out.

Figure 3.7.4c: KOP #2: Proposed Action Maximum Build Out (Year 32). Active waste rock dumps and low-grade ore stockpiles.

Figure 3.7.4d: KOP#2: Proposed Action Fully Reclaimed.

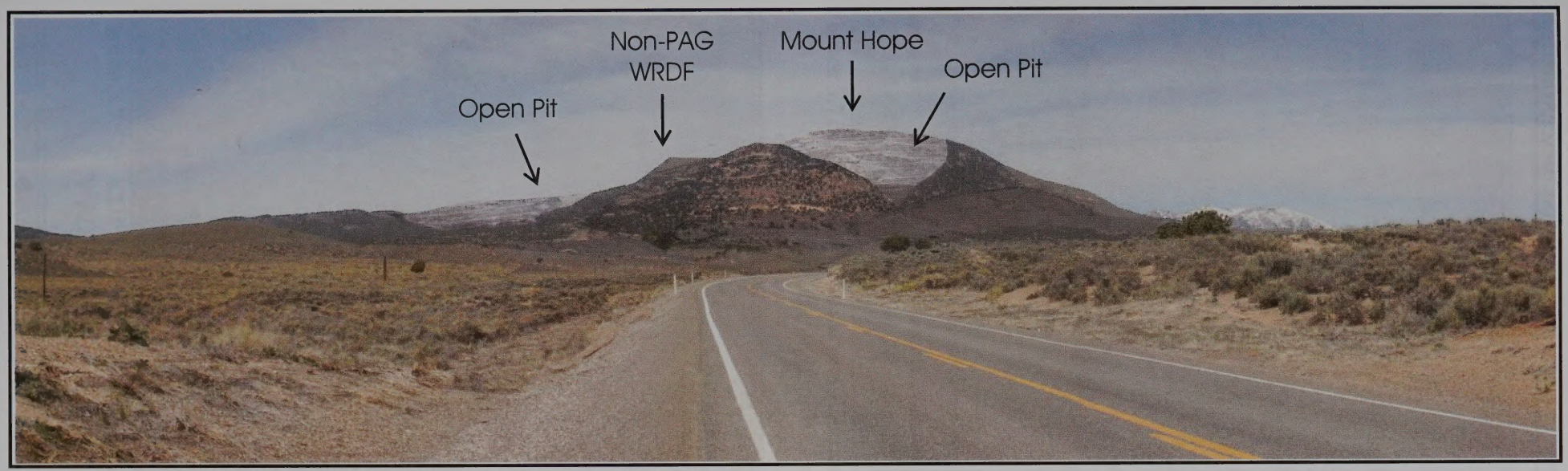


Figure 3.7.4e: KOP #2: Partial Backfill Alternative Fully Reclaimed.

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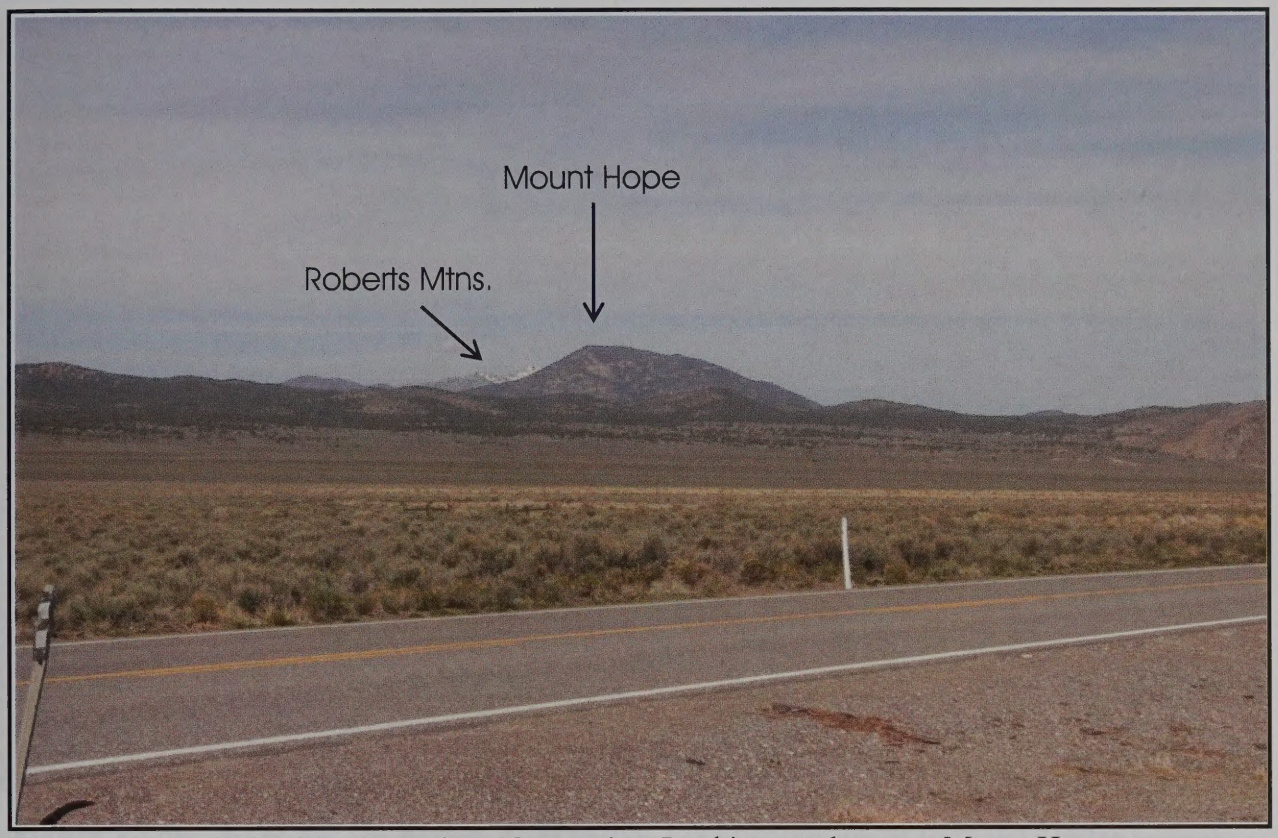


Figure 3.7.5a: KOP #3: No Action Alternative. Looking northwest at Mount Hope approximately eight miles from 11th Street intersection with State Highway 278.

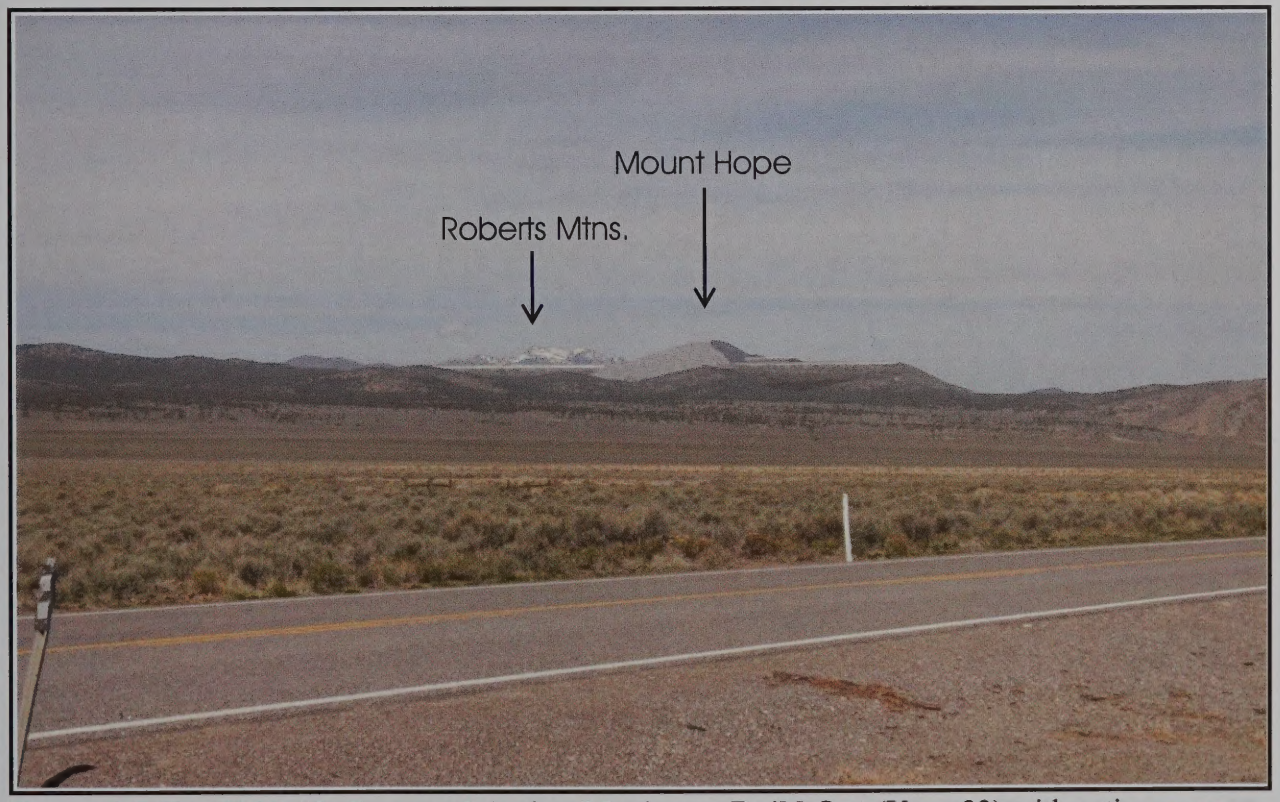


Figure 3.7.5b: KOP #3: Proposed Action Maximum Build Out (Year 32) with active upper WRDFs.

Figure 3.7.5c: KOP #3: Proposed Action Fully Reclaimed.

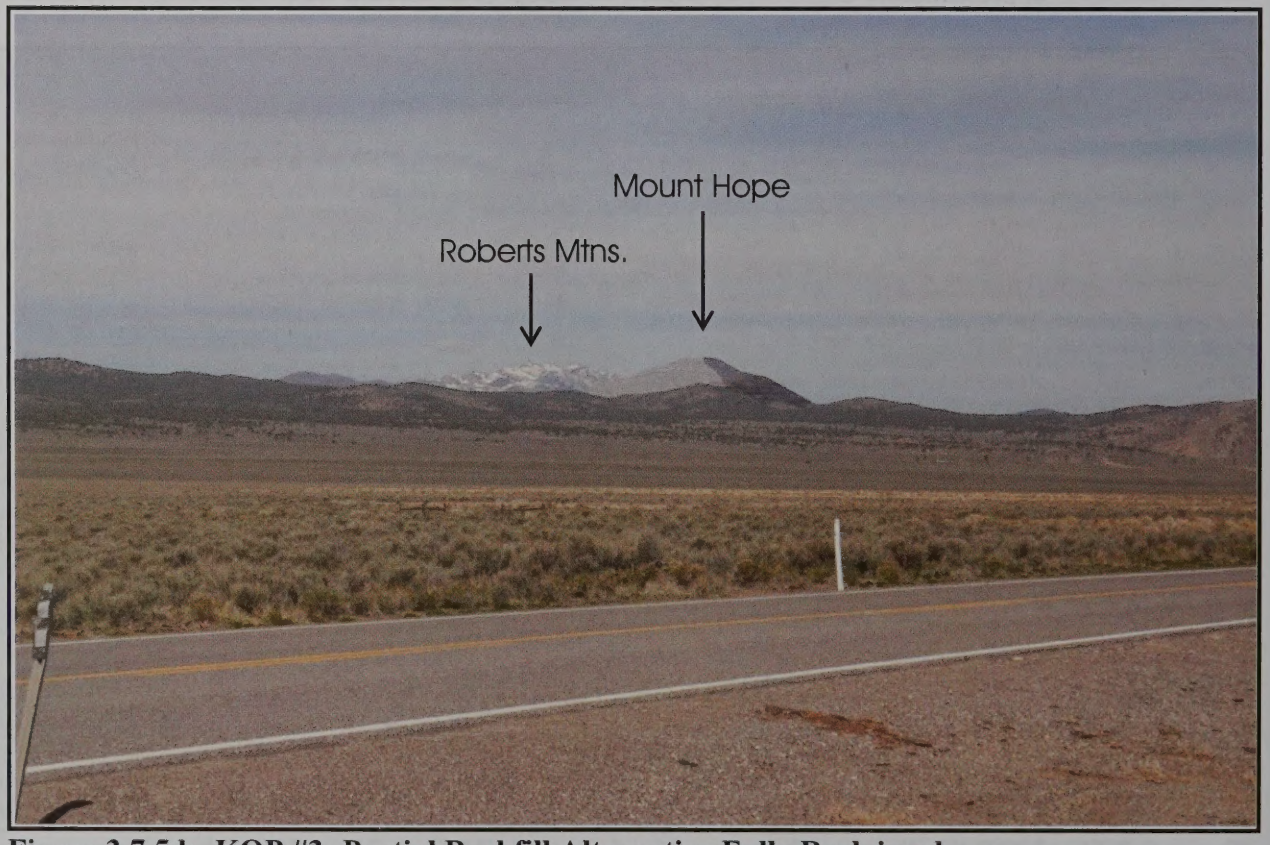


Figure 3.7.5d: KOP #3: Partial Backfill Alternative Fully Reclaimed.

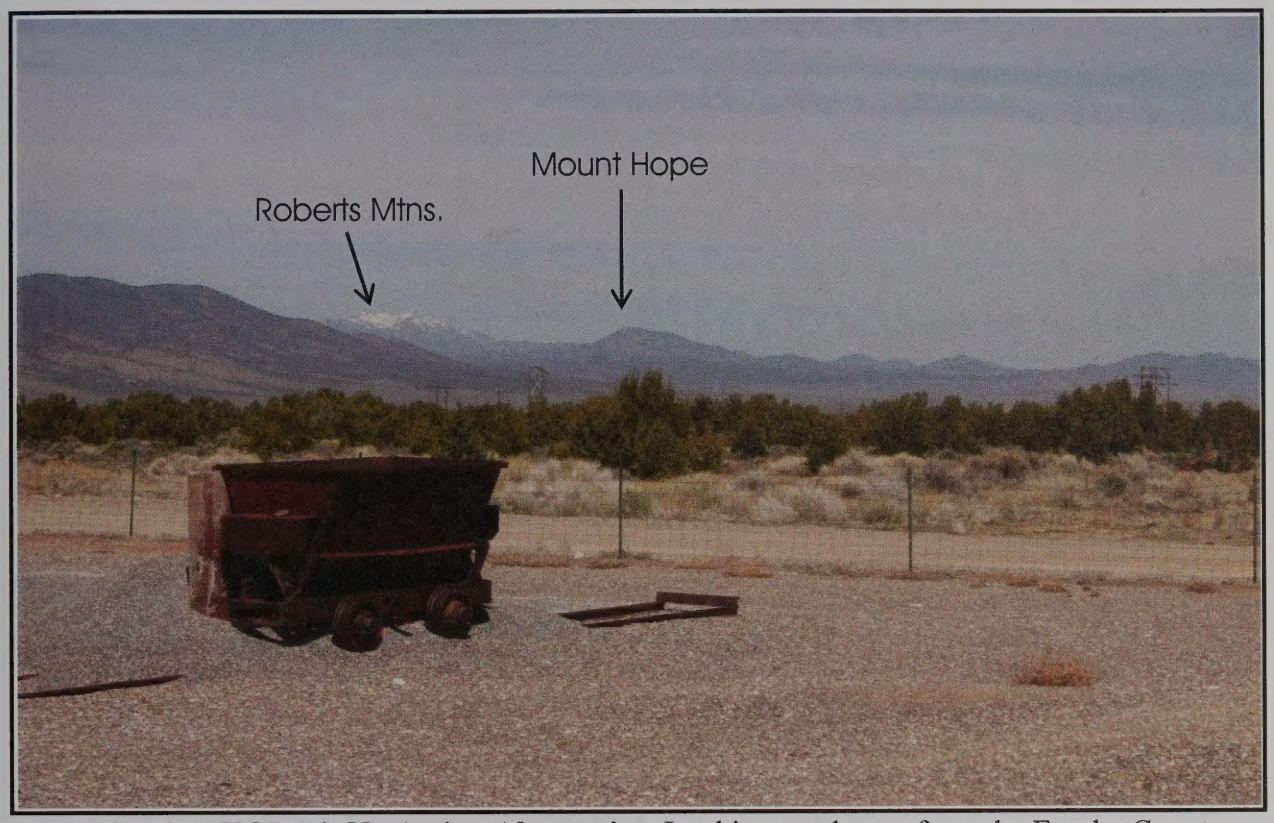


Figure 3.7.6a: KOP #4: No Action Alternative. Looking northwest from the Eureka County Fairgrounds (approximately 22 miles).

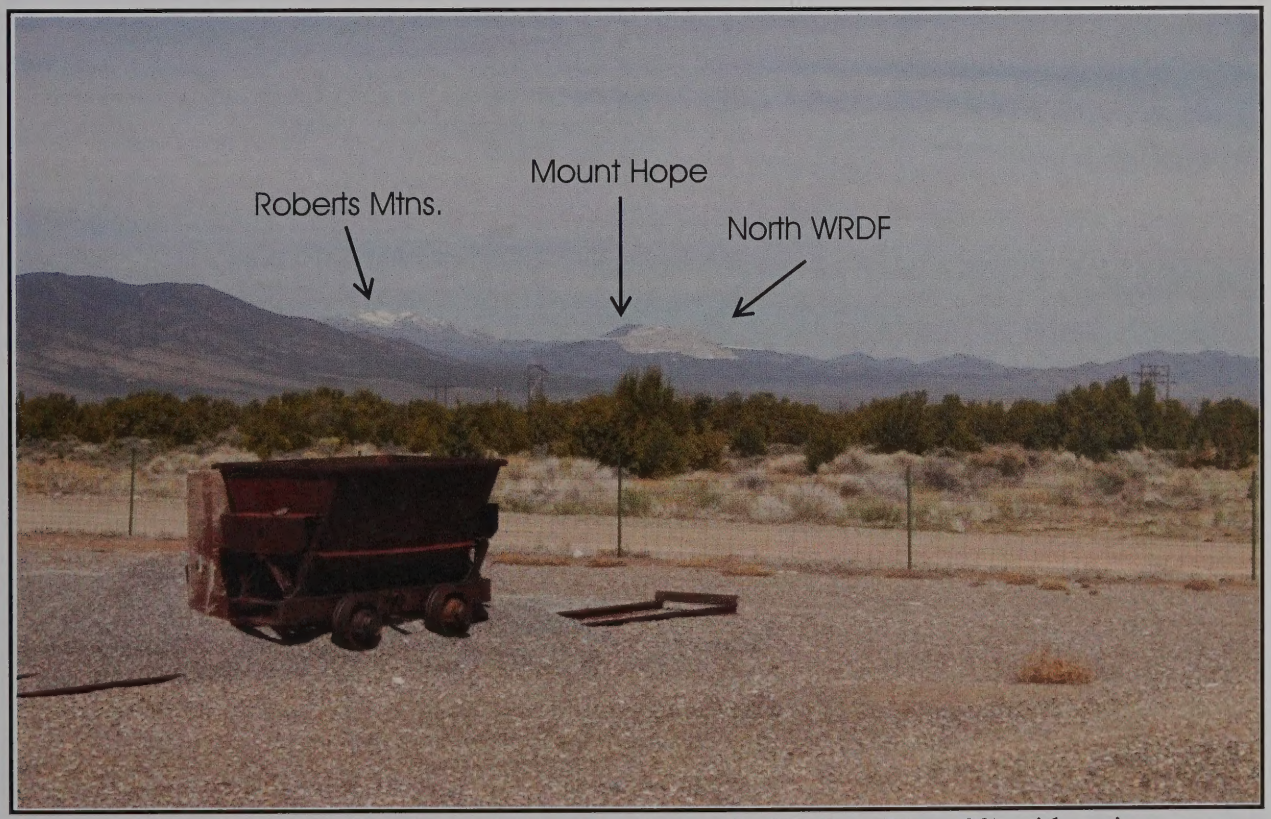


Figure 3.7.6b: KOP #4: Proposed Action Maximum Build Out (Year 32) with active upper WRDFs

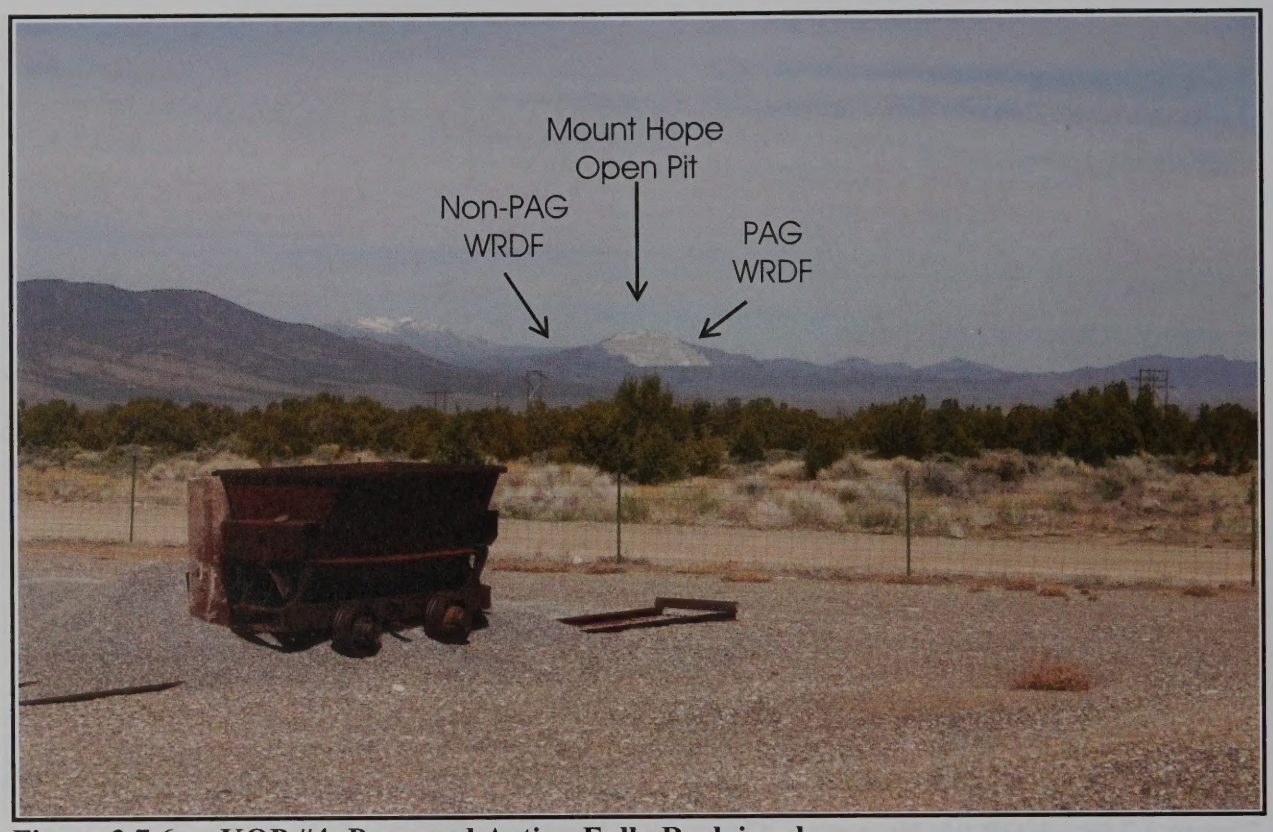


Figure 3.7.6c: KOP #4: Proposed Action Fully Reclaimed.

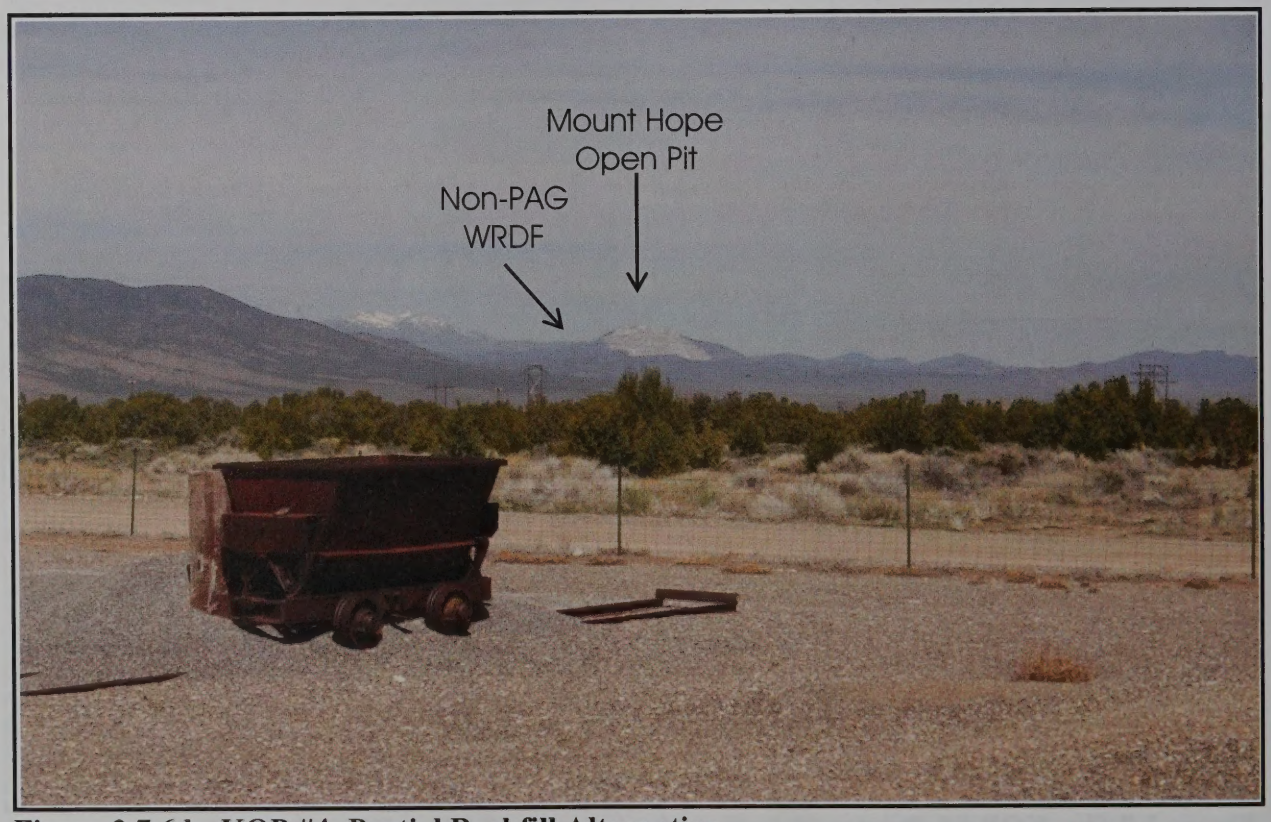


Figure 3.7.6d: KOP #4: Partial Backfill Alternative.

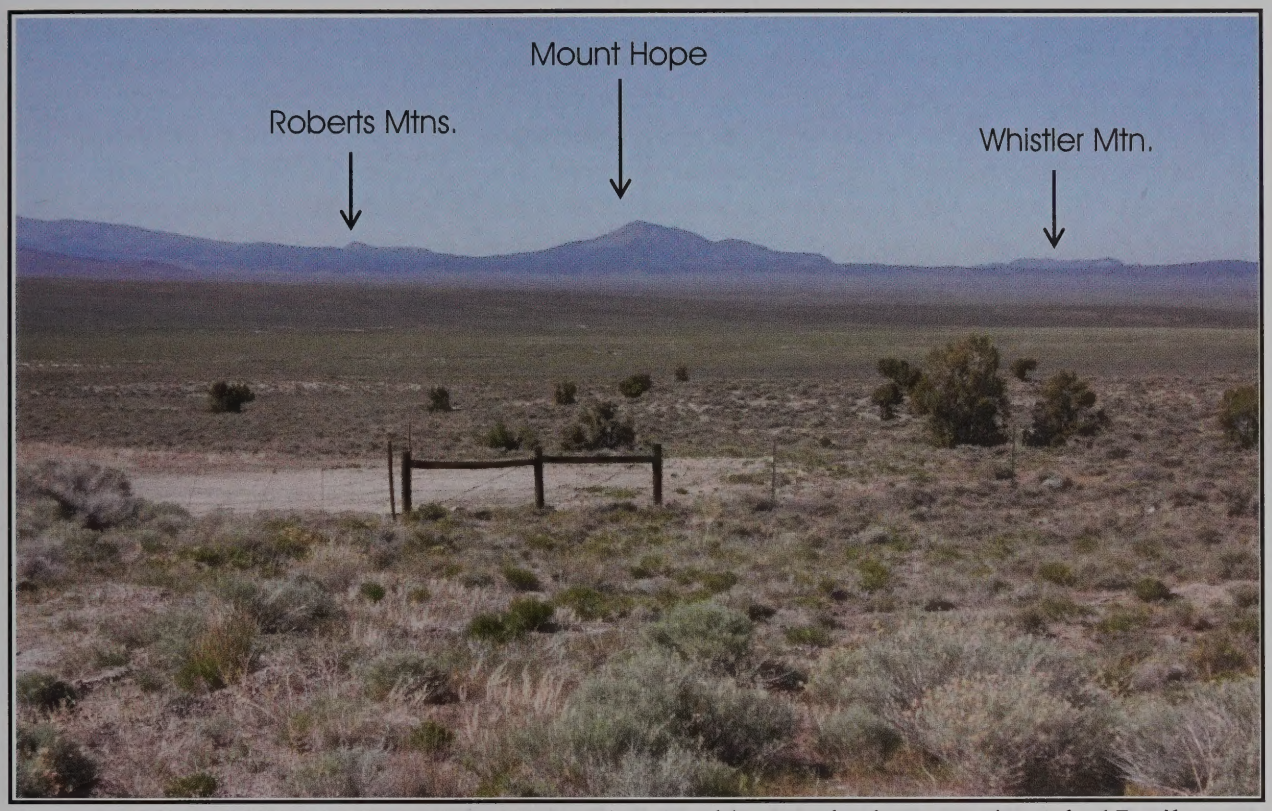


Figure 3.7.7a: KOP #5: No Action Alternative. Looking northerly approximately 17 miles from intersection of Roberts Creek Road and Highway 50.

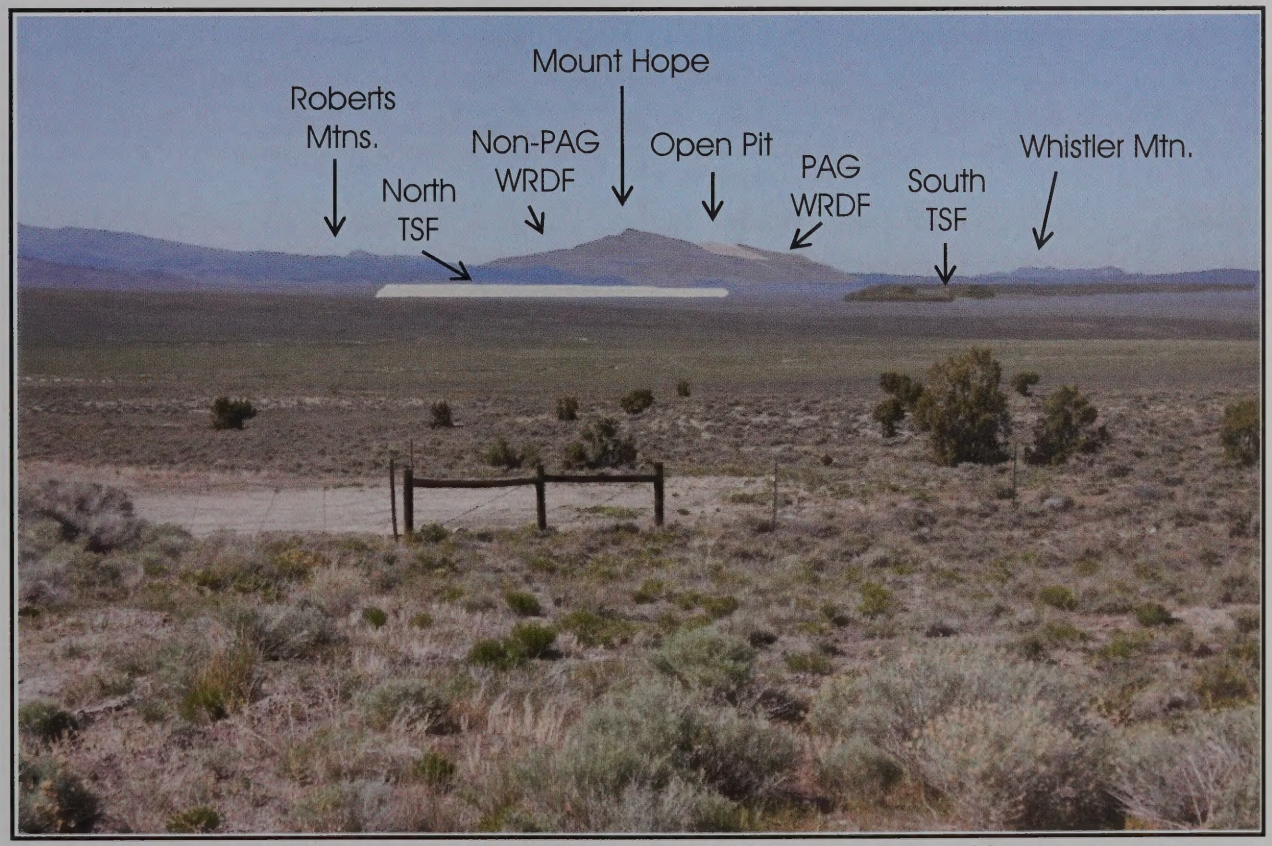


Figure 3.7.7b: KOP #5: Proposed Action Maximum Build Out (Year 44).

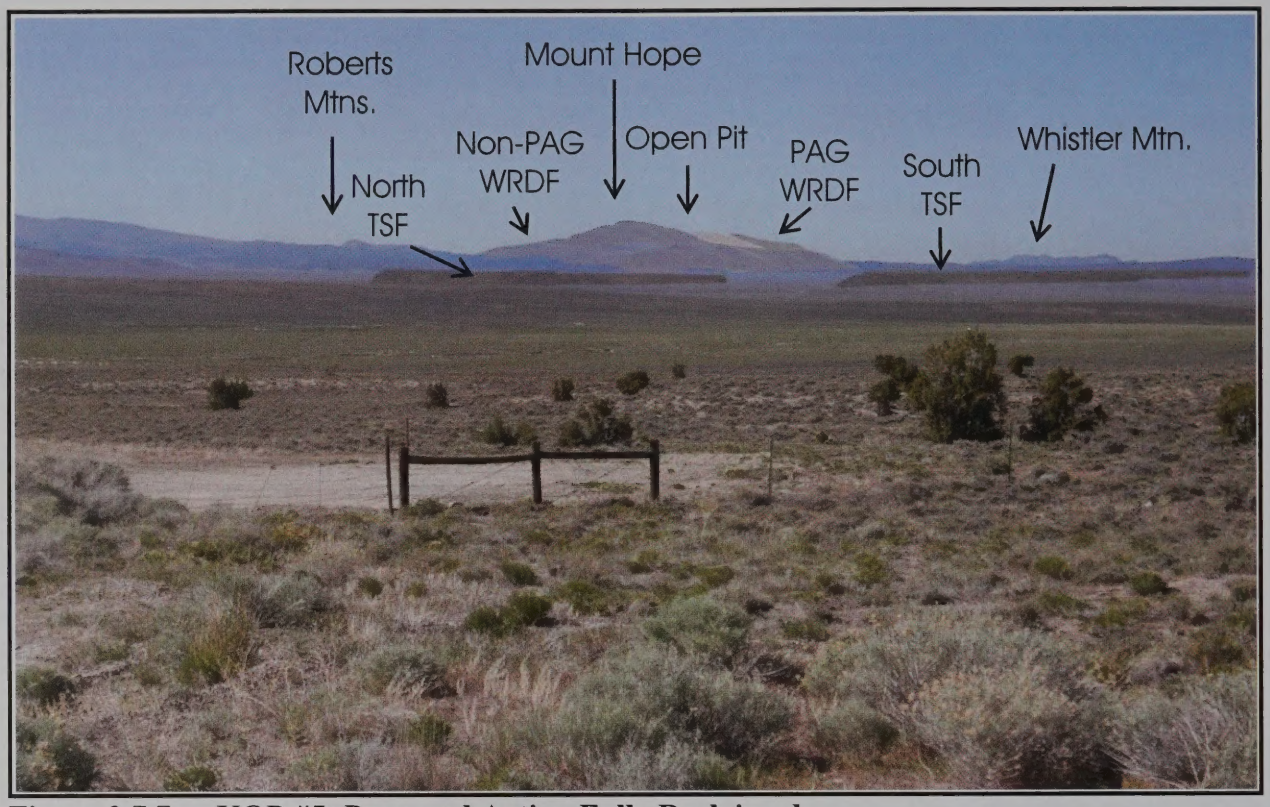


Figure 3.7.7c: KOP #5: Proposed Action Fully Reclaimed.

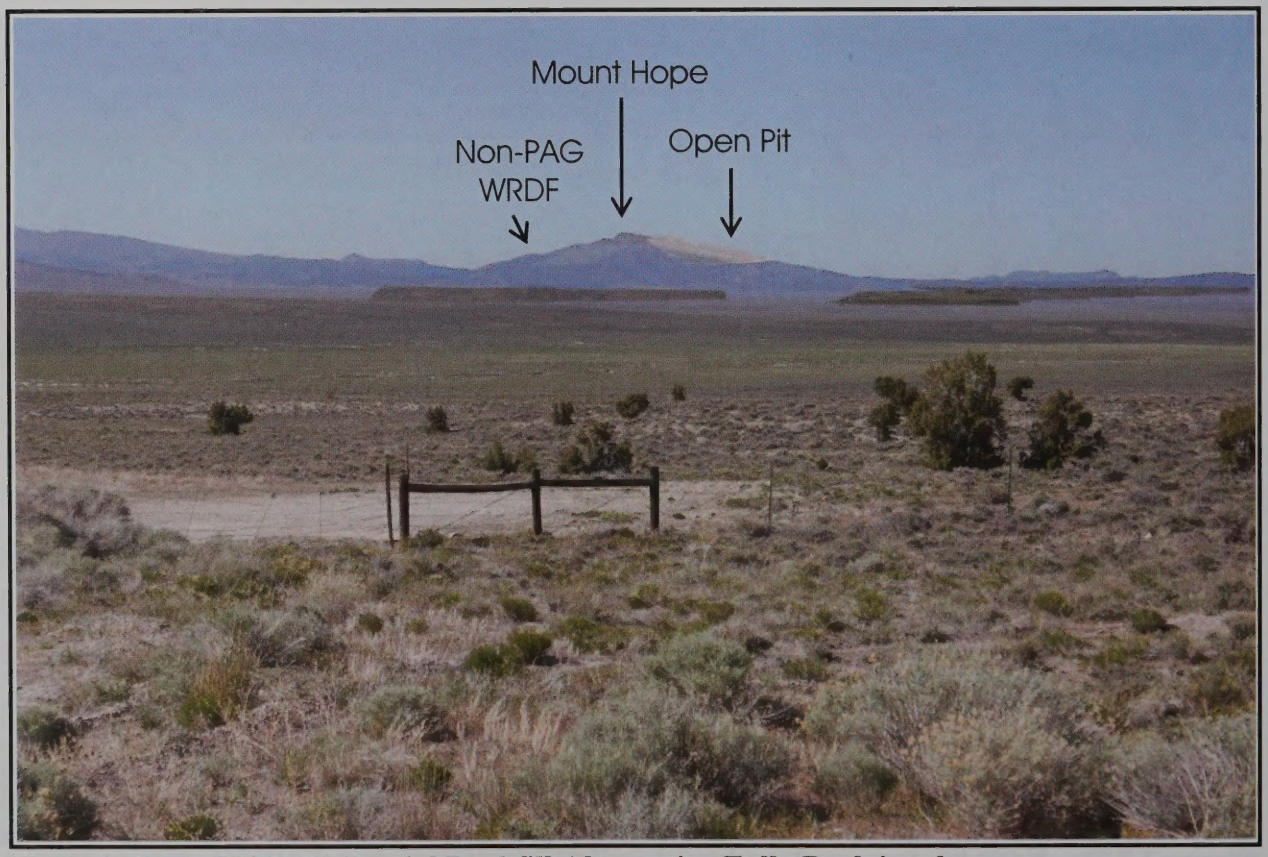


Figure 3.7.7d: KOP #5: Partial Backfill Alternative Fully Reclaimed.

Clearing of land for WRDFs and facility construction would be done by creating curvilinear boundaries instead of straight lines to minimize disturbance of the landscape. Grading would proceed in a manner that would minimize erosion and conform to the natural topography. Revegetation following recontouring would also reduce visual impacts. The specifics on the final reclamation design implementation would be completed in consultation with interested parties.

- **Effectiveness of Mitigation and Residual Effects:** The effectiveness of this mitigation in reducing the impact to less than significant is not likely; however, given the type and scale of the action this mitigation would be the most effective approach at limiting the impact. The Proposed Action would result in unavoidable physical change in the existing contour and character of the Project Area. The changes would be visibly most apparent over the active life of the Project, but would diminish through the completion of reclamation and revegetation activities contained as part of the Proposed Action. The physical changes to the area would be permanent, but would lessen following the completion of final reclamation as natural processes continue to soften the line and form to match the surrounding landscape.

- **Impact 3.7.3.3-2:** The proposed buildings associated with mining activities would be visible from KOP #2 during mining and processing operations, which is not consistent with VRM Class III management.

  Significance of the Impact: This impact is considered significant because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.3-2:** Visual contrast, associated with the buildings, would be reduced by using construction materials or paints that are earth tones. This would minimize color contrasts with the surrounding landscape and help meet VRM objectives.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would minimize color contrasts within the viewshed and effectively mitigate visual impacts from the buildings. There would be no residual effects from this impact.

3.7.3.3.2 Lighting Effects

The Proposed Action would result in unavoidable increases in the amount of light pollution associated with lighting required primarily for safety at the various facilities (processing facility, WRDFs, roads, etc.).

- **Impact 3.7.3.3-3:** The proposed mining activities would increase light pollution in the region.

  Significance of the Impact: This impact is not considered significant; however, the following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.3-3:** To maintain dark sky conditions, and minimize visual disturbance, facility perimeter lighting, including lighting used to illuminate walkways, roadways, staging areas and parking areas, would be shielded so that the light would be

cast in a downward direction. Low-pressure sodium lighting (or an improved technology, if readily available) would be used to reduce or eliminate detrimental lighting impacts and prevent unnecessary light pollution.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would reduce the effects on the surrounding area and effectively mitigate impacts associated with light pollution in keeping with the objectives of dark sky goals.

3.7.3.4 No Action Alternative

Under the No Action Alternative, EML would not be authorized to develop the Project and mine the Mount Hope ore body as currently defined under the Proposed Action. The No Action Alternative would result from the BLM disallowing the activities proposed under the Plan (EML 2006); however, EML would be able to continue exploration activities as outlined in previously submitted Notices. Refer to Section 1.3 for a discussion of the existing Notice level activities. The area would remain available for future mineral development or for other purposes as approved by the BLM and at the time those actions are proposed and they would be subject to additional site specific environmental analysis.

3.7.3.4.1 KOP Effects

Under the No Action Alternative, none of the impacts associated with the Proposed Action would occur. Any visual impacts generated by exploration activities under Notice-level activities would be below the level of significance.

Under the No Action Alternative there would be no Residual Adverse Impacts.

3.7.3.4.2 Lighting Effects

Under the No Action Alternative, none of the impacts associated with the Proposed Action would occur. Any light pollution generated by exploration activities under Notice-level activities would be below the level of significance.

Under the No Action Alternative there would be no Residual Adverse Impacts.

3.7.3.5 Partial Backfill Alternative

Under this alternative, the Proposed Action would be developed and have the same surface disturbance footprint; however, at the end of mining, the open pit would be partially backfilled to eliminate the potential for a pit lake. The open pit would be backfilled to an elevation that varies from northwest to southeast across the open pit from approximately 7,300 to 6,850 feet amsl. The backfilling would commence in Year 32 and be completed in approximately 13 years.

3.7.3.5.1 KOP Effects

The visual impacts under the Partial Backfill Alternative would be proportionally less than that described for the Proposed Action, except that the finalization of post-mining reclamation would be delayed for 13 years and it would take longer for the revegetation to mitigate visual impacts. The Partial Backfill Alternative requires that a portion of the waste rock removed during mining

be dumped back into the open pit to the point that would eliminate the potential for a pit lake. The impacts from the Partial Backfill Alternative are essentially the same as the Proposed Action, though generally slightly less due to the smaller WDRFs. However, this is most pronounced from KOP #2 where the reclaimed view (Figure 2.7.3e) does not have the Non-PAG WRDF and a portion of the open pit is covered by backfill.

- **Impact 3.7.3.5-1:** The proposed mining activities would be visible from all five KOPs. The visual impacts would be consistent with VRM Class IV management at KOPs #1, #3, #4, and #5. From KOP #2, which is the only KOP where the Class III management area is visible, the view is not consistent with that management class.

  Significance of the Impact: This impact is considered significant, because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.5-1:** For reducing visual contrast, minimization of disturbance would be the most effective mitigation technique. Where disturbance is proposed, repetition of the basic landscape elements (form, line, color, and texture) would be implemented to minimize visual change. **In order to lessen long-term visual impacts from the pit wall, treatment may be required to ensure that the final pit wall mimics the surrounding landscape colors as visible from KOP #2. Methods could include, but are not limited to, painting, staining, varnishing, or some other treatment that minimizes the contrast of the visibly exposed and unweathered rock of the pit wall. Any mitigation applications must be pH neutral and contain no caustic or alkaline chemicals to avoid potential adverse environmental impacts. Treatment may occur when the pit wall reaches its final slope configuration. The need for this treatment would be determined by the BLM at that time based on the color of the exposed pit wall surface and its contrast with the surrounding landscape. Specific dimensions and areas of mitigation would be determined by the BLM, based on the actual color of the final pit wall.**

  Clearing of land for WRDFs and facility construction would be done by creating curvilinear boundaries instead of straight lines to minimize disturbance of the landscape. Grading would proceed in a manner that would minimize erosion and conform to the natural topography. Revegetation following recontouring would also reduce visual impacts. The specifics on the final reclamation design implementation would be completed in consultation with interested parties.

- **Effectiveness of Mitigation and Residual Effects:** The effectiveness of this mitigation in reducing the impact to less than significant is not likely; however, given the type and scale of the action this mitigation would be the most effective at limiting the impact.

- **Impact 3.7.3.5-2:** The proposed buildings associated with the Partial Backfill Alternative would be visible from KOP #2 during mining and processing operations, which is not consistent with VRM Class III management.

  Significance of the Impact: This impact is considered significant because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.5-2:** Visual contrast, associated with the buildings, would be reduced by using construction materials or paints that are earth tones. This would minimize color contrasts with the surrounding landscape.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would minimize color contrasts within the viewshed and effectively mitigate visual impacts from the buildings. There would be no residual effects from this impact.

3.7.3.5.2 Lighting Effects

The Partial Backfill Alternative would result in unavoidable increases in the amount of light pollution associated with lighting required primarily for safety at the various facilities (processing facility, WRDFs, roads, etc.).

- **Impact 3.7.3.5-3:** The proposed mining activities associated with the Partial Backfill Alternative would increase light pollution in the region.

  Significance of the Impact: This impact is not considered significant; however, the following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.5-3:** To maintain dark sky conditions, and minimize visual disturbance, facility perimeter lighting, including lighting used to illuminate walkways, roadways, staging areas and parking areas, would be shielded so that the light would be cast in a downward direction. Low-pressure sodium lighting (or an improved technology, if readily available) would be used to reduce or eliminate detrimental lighting impacts and prevent unnecessary light pollution.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would reduce the effects on the surrounding area and effectively mitigate impacts associated with light pollution in keeping with the objectives of dark sky goals.

The Partial Backfill Alternative would result in unavoidable physical changes in the existing contour and character of the Project Area. The changes would be visibly most apparent over the active life of the Project, but would diminish through the completion of reclamation and revegetation activities contained as part of the Proposed Action. The physical changes to the area would be permanent, but would lessen following the completion of final reclamation as natural processes continue to soften the line and form to match the surrounding landscape.

3.7.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Under this alternative, the open pit, WRDFs, and TSFs would be developed as outlined under the Proposed Action; however, the ore processing facilities would include only the milling operations and production of the molybdenum sulfide concentrate. The TMO and FeMo portions of the processing facility would not be constructed, and as a result, the surface disturbance footprint would be approximately 20 acres less than under the Proposed Action. In addition, the leaching of the concentrate would likely not be done on site. The production of molybdenum sulfide concentrate would occur at an average rate of approximately 45.8 million pounds per year. This material would be stored at the Project Area in a concentrate storage structure adjacent to the mill. The molybdenum sulfide concentrate would be loaded from this storage facility into

street legal haul trucks with covered containers and transported on the public transportation system to either an existing or new TMO facility.

3.7.3.6.1 KOP Effects

The visual impacts under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be essentially the same as those under the Proposed Action. Please refer to Figures 3.7.2 a, b, and c for visual contrasts for existing views and photosimulations showing Year 44 and post-reclamation views. The impacts and mitigation measures outlined for the Proposed Action incorporate the Off-Site Transfer of Ore Concentrate for Processing Alternative.

- **Impact 3.7.3.6-1:** The proposed mining activities would be visible from all five KOPs. The visual impacts would be consistent with VRM Class IV management at KOPs #1, #3, #4, and #5. From KOP #2, which is the only KOP where the Class III management area is visible, the view is not consistent with that management class.

  Significance of the Impact: This impact is considered significant, because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.6-1:** For reducing visual contrast, minimization of disturbance would be the most effective mitigation technique. Where disturbance is proposed, repetition of the basic landscape elements (form, line, color, and texture) would be implemented to minimize visual change. **In order to lessen long-term visual impacts from the pit wall, treatment may be required to ensure that the final pit wall mimics the surrounding landscape colors as visible from KOP #2. Methods could include, but are not limited to, painting, staining, varnishing, or some other treatment that minimizes the contrast of the visibly exposed and unweathered rock of the pit wall. Any mitigation applications must be pH neutral and contain no caustic or alkaline chemicals to avoid potential adverse environmental impacts. Treatment may occur when the pit wall reaches its final slope configuration. The need for this treatment would be determined by the BLM at that time based on the color of the exposed pit wall surface and its contrast with the surrounding landscape. Specific dimensions and areas of mitigation would be determined by the BLM, based on the actual color of the final pit wall.**

  Clearing of land for WRDFs and facility construction would be done by creating curvilinear boundaries instead of straight lines to minimize disturbance of the landscape. Grading would proceed in a manner that would minimize erosion and conform to the natural topography. Revegetation following recontouring would also reduce visual impacts. The specifics on the final reclamation design implementation would be completed in consultation with interested parties.

- **Effectiveness of Mitigation and Residual Effects:** The effectiveness of this mitigation in reducing the impact to less than significant is not likely; however, given the type and scale of the action this mitigation would be the most effective at limiting the impact.

- **Impact 3.7.3.6-2:** The proposed buildings associated with the Off-Site Transfer of Ore Concentrate for Processing Alternative would be visible from KOP #2 during mining and processing, which is not consistent with VRM Class III management.

  Significance of the Impact: This impact is considered significant because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.6-2:** Visual contrast, associated with the buildings, would be reduced by using construction materials or paints that are earth tones. This would minimize color contrasts with the surrounding landscape.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would minimize color contrasts within the viewshed and effectively mitigate visual impacts from the buildings. There would be no residual effects from this impact.

3.7.3.6.2 Lighting Effects

The Partial Backfill Alternative would result in unavoidable increases in the amount of light pollution associated with lighting required primarily for safety at the various facilities (processing facility, WRDFs, roads, etc.).

- **Impact 3.7.3.6-3:** The proposed mining activities associated with the Off-Site Transfer of Ore Concentrate for Processing Alternative would increase light pollution in the region.

  Significance of the Impact: This impact is not considered significant; however, the following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.6-3:** To maintain dark sky conditions, and minimize visual disturbance, facility perimeter lighting, including lighting used to illuminate walkways, roadways, staging areas and parking areas, would be shielded so that the light would be cast in a downward direction. Low-pressure sodium lighting (or an improved technology, if readily available) would be used to reduce or eliminate detrimental lighting impacts and prevent unnecessary light pollution.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would reduce the effects on the surrounding area and effectively mitigate impacts associated with light pollution in keeping with the objectives of dark sky goals.

The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in unavoidable physical change in the existing contour and character of the Project Area. The changes would be visibly most apparent over the active life of the Project, but would diminish through the completion of reclamation and revegetation activities contained as part of the Proposed Action. The physical changes to the area would be permanent, but would lessen following the completion of final reclamation as natural processes continue to soften the line and form to match the surrounding landscape.

3.7.3.7 Slower, Longer Project Alternative

Under this alternative, the open pit, WRDFs, TSFs, and processing facilities would be developed as outlined under the Proposed Action; however, the overall Project would occur at half the rate of the Proposed Action and take twice as long to complete.

3.7.3.7.1 KOP Effects

The visual impacts under the Slower, Longer Project Alternative would be essentially the same as those under the Proposed Action; however, those impacts would occur over a different and longer time frame. Please refer to Figures 3.7.2 a, b, and c for visual contrasts for existing views and photosimulations showing what would be Year 88 and post-reclamation views. The impacts and mitigation measures outlined for the Proposed Action incorporate the Slower, Longer Project Alternative.

- **Impact 3.7.3.7-1:** The proposed mining activities would be visible from all five KOPs. The visual impacts would be consistent with VRM Class IV management at KOPs #1, #3, #4, and #5. From KOP #2, which is the only KOP where the Class III management area is visible, the view is not consistent with that management class.

  Significance of the Impact: This impact is considered significant, because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.7-1:** For reducing visual contrast, minimization of disturbance would be the most effective mitigation technique. Where disturbance is proposed, repetition of the basic landscape elements (form, line, color, and texture) would be implemented to minimize visual change. **In order to lessen long-term visual impacts from the pit wall, treatment may be required to ensure that the final pit wall mimics the surrounding landscape colors as visible from KOP #2. Methods could include, but are not limited to, painting, staining, varnishing, or some other treatment that minimizes the contrast of the visibly exposed and unweathered rock of the pit wall. Any mitigation applications must be pH neutral and contain no caustic or alkaline chemicals to avoid potential adverse environmental impacts. Treatment may occur when the pit wall reaches its final slope configuration. The need for this treatment would be determined by the BLM at that time based on the color of the exposed pit wall surface and its contrast with the surrounding landscape. Specific dimensions and areas of mitigation would be determined by the BLM, based on the actual color of the final pit wall.**

  Clearing of land for WRDFs and facility construction would be done by creating curvilinear boundaries instead of straight lines to minimize disturbance of the landscape. Grading would proceed in a manner that would minimize erosion and conform to the natural topography. Revegetation following recontouring would also reduce visual impacts. The specifics on the final reclamation design implementation would be completed in consultation with interested parties.

- **Effectiveness of Mitigation and Residual Effects:** The effectiveness of this mitigation in reducing the impact to less than significant is not likely; however, given the type and

scale of the action this mitigation would be the most effective at limiting the impact. The Slower, Longer Project Alternative would result in unavoidable physical change in the existing contour and character of the Project Area. The changes would be visibly most apparent over the active life of the Project, but would diminish through the completion of reclamation and revegetation activities contained as part of the Slower, Longer Project Alternative. The physical changes to the area would be permanent, but would lessen following the completion of final reclamation as natural processes continue to soften the line and form to match the surrounding landscape.

- **Impact 3.7.3.7-2:** The proposed buildings associated with the Slower, Longer Project Alternative would be visible from KOP #2, which is not consistent with VRM Class III management.

  Significance of the Impact: This impact is considered significant because of the views from KOP #2 during mining and process operations. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.7-2:** Visual contrast, associated with the buildings, would be reduced by using construction materials or paints that are earth tones. This would minimize color contrasts with the surrounding landscape.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would minimize color contrasts within the viewshed and effectively mitigate visual impacts from the buildings. There would be no residual effects from this impact.

3.7.3.7.2 Lighting Effects

The Slower, Longer Project Alternative would result in unavoidable increases in the amount of light pollution associated with lighting required primarily for safety at the various facilities (processing facility, WRDFs, roads, etc.).

- **Impact 3.7.3.7-3:** The proposed mining activities associated with the Off-Site Transfer of Ore Concentrate for Processing Alternative would increase light pollution in the region.

  Significance of the Impact: This impact is not considered significant; however, the following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.7-3:** To maintain dark sky conditions, and minimize visual disturbance, facility perimeter lighting, including lighting used to illuminate walkways, roadways, staging areas and parking areas, would be shielded so that the light would be cast in a downward direction. Low-pressure sodium lighting (or an improved technology, if readily available) would be used to reduce or eliminate detrimental lighting impacts and prevent unnecessary light pollution.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would reduce the effects on the surrounding area and effectively mitigate impacts associated with light pollution in keeping with the objectives of dark sky goals.

3.8 Soil Resources

The soils resources section identifies the existing soil characteristics in the approximately **22,886**-acre Project Area, which includes the proposed open pit mine facility area, powerline corridor, and well field development area. This section also describes the potential impacts of the Proposed Action and alternatives on the soil resources within the Project Area, as well as mitigation measures to reduce these impacts.

3.8.1 Regulatory Framework

The laws, regulations, guidelines, and procedures that apply to management of soil resources potentially affected by the Proposed Action include the following:

3.8.1.1 Bureau of Land Management, 43CFR Part 3800

Under 43 CFR Part 3800, the BLM has defined its final rule regarding Mining Claims Under the General Mining Laws; Surface Management to include performance standards that govern the operation and reclamation of surface mining projects. Section 3809.420(6)(b)(3) stipulates that the operator must initiate reclamation at the earliest feasible time and that reclamation shall include, but not be limited to: "(A) Saving of topsoil for final application after reshaping of disturbed areas have been completed; (B) Measures to control erosion, landslides, and water runoff; (C) Measures to isolate, remove, or control toxic materials; [and] (D) Reshaping the area disturbed, application of the topsoil, and revegetation of disturbed areas, where reasonably practicable..." When reclamation has been completed, the authorized officer shall be notified such that an inspection of the reclaimed areas can be made.

3.8.1.2 Nevada Revised Statutes Chapter 519A: Reclamation of Lands Subject to Mining Operations of Exploration Projects

The Project is subject to the reclamation requirements under NRS 519A.200 and NRS 519A.210, which state that "A person shall not engage in a mining operation without a valid permit for that purpose issued by the Division [of Environmental Protection]" and that "A person who desires to engage in a mining operation must...agree in writing to assume the responsibility for the reclamation of any land damaged as a result of the mining operation." These statutes are enforced by NAC519A.325 and .330 which require the removal and stockpiling of topsoil and revegetation of the land. NAC519A.255 states that reclamation is not required beyond that approved by federal agency (i.e., the BLM).

3.8.1.3 Nevada Best Management Practices

The use of BMPs in Nevada is addressed in the Handbook of Best Management Practices published by the Nevada Division of Environmental Protection and the Nevada Division of Conservation Districts (1994). The handbook references two definitions of BMPs. EPA guidelines define BMPs as "methods, measures, or practices to prevent or reduce water pollution, including but not limited to, structural and non-structural controls, operation and maintenance procedures, and scheduling and distribution of activities. Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility." NAC 445A.306 defines "Best Practices" as "measures, methods of

operation or practice that are reasonably designed to prevent, eliminate, or reduce water pollution from diffuse sources and that are consistent with the best practices in the particular field under the conditions applicable. This term is intended to be equivalent to the term 'best management practices' as used in federal statutes and regulations."

3.8.2 Affected Environment

3.8.2.1 Study Methods

The term "soil", as used in this EIS, is defined as a natural body consisting of layers or horizons of minerals or organic matter of variable thickness, which differ from their parent material in their morphological, physical, chemical, and mineralogical properties as well as their biological characteristics. Topography, or local relief, controls much of the distribution of soils in the landscape to such an extent that soils of markedly contrasting morphologies and properties can merge laterally with one another and yet be in equilibrium under existing local conditions (Birkeland 1999).

The USDA NRCS was the primary source of information regarding soil resources within the Project Area. Digital soil survey maps from the Soil Survey Geographic Database (SSURGO) for the Diamond Valley and Eureka County Soil Survey Areas were compared to the Project boundary using GIS. A soil survey report was generated for the soil associations and complexes found within the Project Area. The report includes a description of physical soil characteristics, soil formation descriptions, and qualitative ratings for various soil use and management properties. The NRCS analyses of erodibility hazard potential and potential for use during reclamation activities as fill material and replacement topsoil has been incorporated as part of the evaluation of soil resources within the Project Area. Within the area of the potential water table drawdown in Kobeh Valley, soil erodibility has been assessed by looking at potential changes to the vegetation community.

Soil erodibility hazard potential has been assessed for both water driven and wind driven erosional causes on each soil unit within the Project Area. Erodibility ratings are based on analyzing the dominant conditions of the surface layer of each soil within a soil unit. Water driven causes have been qualified based on the NRCS K factor. The erosion K factor indicates the susceptibility of a soil to sheet and rill erosion by water, based primarily on the percentage of silt, sand, organic matter, and rock fragments within the soil unit and on soil structure and saturated hydraulic conductivity. Values of K range from 0.02 to 0.64 and have been qualified as being "slight" for K factor values between 0.02 and 0.17, "moderate" for values between 0.20 and 0.37, and "severe" for values between 0.43 and 0.64. Wind driven erosional causes have similarly been qualified based on NRCS wind erodibility group (WEG) ratings. WEG ratings range from 1 to 8 with values of 1 and 2 considered "severe", values from 3 to 6 considered "moderate", and values 7 and 8 considered "slight". The WEG value is closely correlated to the texture of the surface layer, the size and durability of surface clods, rock fragments, and organic matter, and the calcareous reaction potential of the soil. Soil moisture and frozen soil layers also influence WEG ratings **(NRCS 2012a)**.

NRCS ratings have been assigned to soils for their potential use as reclamation fill material based on soil properties that affect erosion and stability of the surface layer and the productive potential of the reclaimed soil. These properties include the sodium, salt, and $CaCO_3$ content of the soils, soil reaction (i.e., pH balance), available water capacity, erodibility, texture, rock

content, organic matter content, and other characteristics that affect fertility. Soils are rated "good", "fair", or "poor" based on the amount of suitable fill material available, the ease of excavation, and the performance of the material after it has been replaced. "Good" ratings reflect soils that are well suited for use as fill material, and the establishment of vegetation is relatively easy. "Good" soils are relatively stable, resist erosion, and have good productive potential. "Fair" soils possess certain soil properties that would need to be improved or supplemented to provide suitable fill material that promotes vegetative productivity. "Poor" soils would require difficult and costly improvements in order to provide suitable fill material during reclamation activities **(NRCS 2012a)**.

The NRCS has also assigned "good", "fair", and "poor" ratings to soils based on their potential use as reclamation topsoil. These soil ratings reflect the soil properties that promote plant growth and the ease of removing, loading, and spreading the material. Typically, soils that have been rated "good" contain more organic matter that improves the absorption and retention of water and nutrients, have sufficient depth to provide an adequate amount of material, and contain fewer rock fragments that would interfere with soil removal and spreading than soils rated "fair" or "poor" **(NRCS 2012a)**.

3.8.2.2 Existing Conditions

The Project Area and cumulative effects study area (CESA) are located within the Central Nevada Basin and Range Major Land Resource Area (MLRA) (NRCS 2006). The Central Nevada Basin and Range MLRA is in the Great Basin Section of the Basin and Range geologic province. This area is dominated by nearly level, aggraded desert basins and valleys between series of north south mountain ranges. Locally, the Project Area lies in the southeastern corner of the Roberts Mountain between Kobeh Valley and Diamond Valley in Eureka County, Nevada. The Project Area is centered around Mount Hope, which forms the southern end of the Garden Valley, a subbasin of Pine Valley, and extends to the south and southwest into the Kobeh Valley.

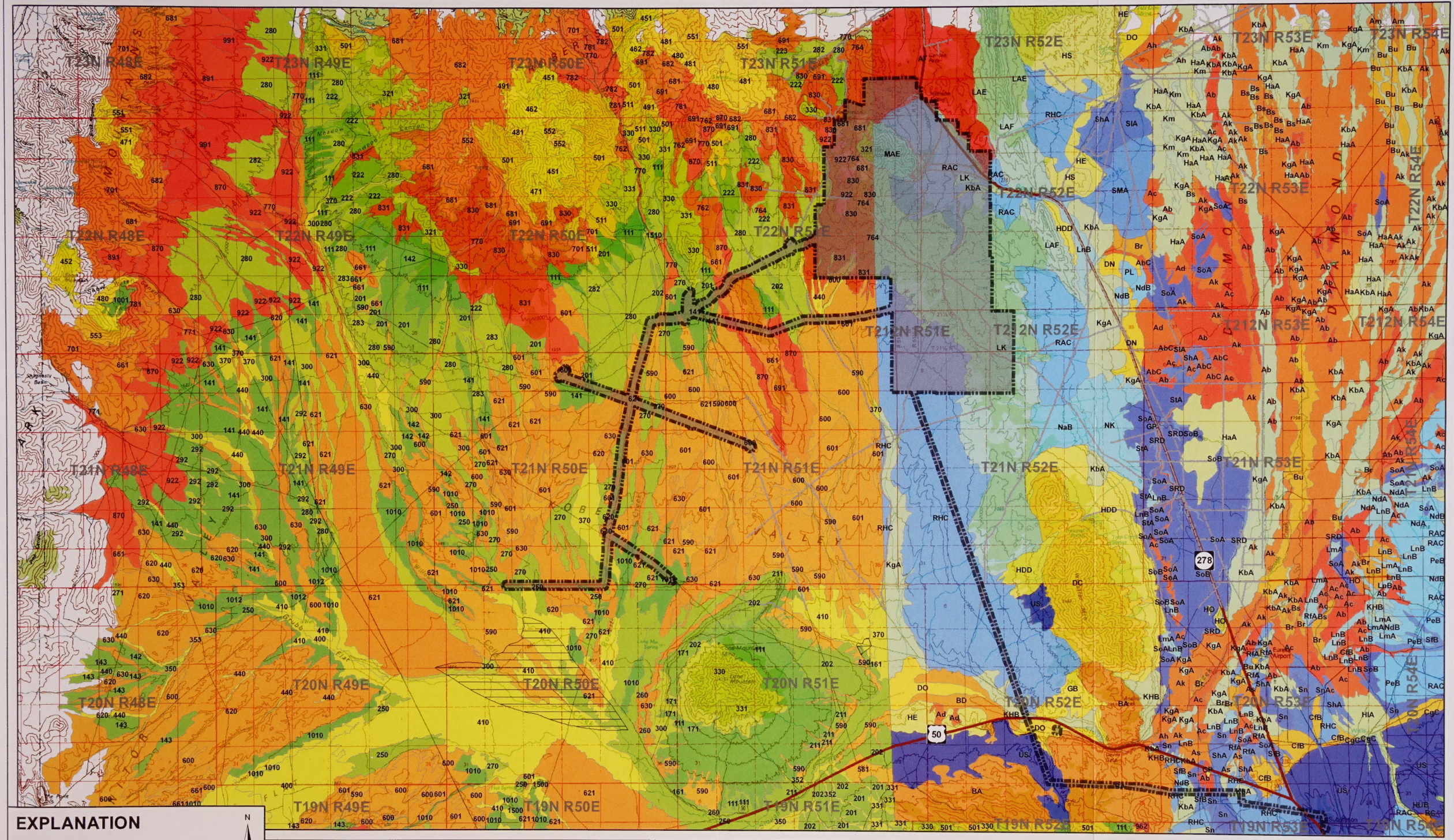
Forty-six soil units were identified within the Project Area from the SSURGO database analysis (Table 3.8-1, Figure 3.8.1). These soil units were mapped in the Diamond Valley and Eureka County Soil Mapping Areas.

Table 3.8-1: Soils in the Project Area

Soil Mapping Unit Symbol	Soil Association or Complex Name	Acreage within the Project Area
Ab	Alhambra fine sandy loam	9.9
AT	Atrypa association	814.5
BA	Bartine-Overland association	214.6
DO	Dianev silty clay loam	44.9
KbA	Kobeh sandy loam	235.2
KHB	Kobeh gravelly fine sandy loam	25.6
LK	Labshaft-Rock outcrop complex	6,815.3
MAE	Mau stony loam	775.7
NdB	Nayped loam	7.5

Soil Mapping Unit Symbol	Soil Association or Complex Name	Acreage within the Project Area
RAC	Ratto gravelly fine sandy loam	3,054.6
RHC	Rubyhill fine sandy loam	3,138.1
SfB	Shipley fine sandy loam	22.5
ShA	Shipley silt loam	10.9
Sn	Shipley complex	18.0
US	Umil association	194.0
141	Pedoli-Poorcal association	320.6
201	Umil loam	49.2
202	Umil-Hayeston association	19.3
250	Dianev silt loam	105.4
270	Poorcal loam	340.8
280	Coils loam	544.7
321	Mau-Shagnasty-Eightmile association	159.9
330	Hopeka-Solak-Ados association	1.1
370	Kobeh gravelly loam	72.1
410	Beanflat silt loam	29.7
440	Akercan loam	133.0
590	Hayeston sandy loam	239.5
600	Rubyhill sandy loam	307.9
601	Rubyhill-Barrier association	909.2
620	Silverado sandy loam	23.2
621	Silverado sandy loam	316.5
630	Jesse Camp silt loam	144.3
661	Akerue-Simpark-Robson association	174.7
681	Chad-Cleavage-Softscrabble association	269.8
764	Shagnasty-Ravenswood-Rock outcrop association	326.5
830	Atrypa gravelly loam	1,526.4
831	Atrypa-Mau association	857.8
870	Fortank very stony loam	113.8
922	Handy loam	354.1
1010	Bubus loam	164.7
Total		22,885.6

Shaded rows denote mapping units that occur in the Diamond Valley Area, including portions of Eureka, Elko, and White Pine Counties. All other mapping units occur in the Eureka County Area.



EXPLANATION

- Project Boundary
- Unpaved Road
- Eureka County Area Soil Associations
- Diamond Valley Area Soil Associations
- Phreatophytes within the 10-Foot Drawdown

N

0 1 2 3 4 5 6 7 Miles

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BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Soil Mapping Units within the Project Area

Figure 3.8.1

The soils in the mountainous central part of the Project Area are typically very stony to very gravelly loams found on eight to 50 percent slopes intermixed with rocky outcrops. These soils are shallow to moderately deep over lithic and paralithic bedrock and derive from residuum and colluvium from mixed igneous, metamorphic, and volcanic rocks. Soils found in the hilly terrain surrounding Mount Hope are on slopes ranging from four to 30 percent and derive from volcanic rocks and limestone.

The Project Area extends south and southwest as the topography transitions into the Kobeh Valley. Soils are found on alluvial fans, inset fans, fan pediments, skirts, and remnants as the terrain becomes more gentle and slopes decrease to eight percent or less. These soils are moderately deep to deep over duripan and derive from alluvium from mixed igneous, sedimentary, and volcanic rocks and ash. Soil texture becomes more fine as gravelly loams give way to fine sandy and silty loams. Soils found in the basins and basin floors within the Project Area are deep and derive from alluvium from mixed rocks and volcanic ash.

Soil unit composition and physical characteristics are detailed in Table 3.8-2. The NRCS surface soil erodibility ratings for the soils within the Project Area are shown on Figure 3.8.2 and the NRCS ratings for soil use potential as reclamation fill material and topsoil are portrayed in Figure 3.8.3. These erodibility hazard ratings and soil use ratings were derived from the analysis of various physical soil properties and characteristics that promote ease of use, stability, and revegetative success described in Section 3.8.2.1.

Approximately 93.1 percent of the soils within the Project Area are rated "moderate" to "slight / moderate" for both wind and water driven erosion potential. A small percentage of the soils within the Project Area (approximately 4.3 percent) have a "severe" soil erodibility hazard rating for water caused erosion. These soils are located in the northern, western, and southern segments of the well field development area and the southern portion of the powerline corridor. Soils that have "slight" erodibility ratings are found on the western and southwestern slopes of Mount Hope and the eastern segments of the well field development area. These soils make up approximately 2.6 percent of the Project Area (Figure 3.8.2).

The majority of the Project Area is centered on Mount Hope and the surrounding foothills and pediments. The soils in these areas, making up approximately 72 percent of the Project Area, are considered "poor" for use as either reclamation fill material or topsoil. Scattered portions of the powerline corridor and well field areas extending south and southwest into the Kobeh Valley consist of soils that are rated "fair" for use as fill material. Soils in the powerline corridor are also considered "fair" for use as topsoil; however, only two percent of the Project Area, located in the northern and western segments of the well field area, contain soils that are rated "good" for use as topsoil (Figure 3.8.3).

In general, the soils within the Project Area would require moderate to substantial improvements for use as either fill material or topsoil that would promote optimal vegetative productivity. The consequences of weather and climate change on soils can be subtle and complex. The projected changes in climate – increases in temperature, reductions in soil moisture, and more intense rainfall events – may affect erosion, ability of soils to sequester carbon, impacts to soil moisture, and fugitive dust concentrations.

3.8.3 Environmental Consequences and Mitigation Measures

Potential issues related to soil resources within the Project Area as a result of the Proposed Action and alternatives include the following:

- Potential erosional impacts or loss of physical soil stability;
- Availability of suitable soils and growth media for reclamation;
- Potential for alteration in soil chemical stability; and
- Potential for successfully reclaiming mine-related disturbance.

3.8.3.1 Significance Criteria

Environmental impacts to soils would be significant if the Proposed Action or other alternatives resulted in any of the following:

- Accelerated erosion in excess of soil loss tolerances on waste rock, pit slope, or stockpile facilities or other sloped surfaces;
- Substantial decrease in downstream water resource quality from erosion and sedimentation;
- Substantial decrease in the amount of overall site productivity from pre-mining to post-mining land uses;
- Compromised public safety through mass instabilities on slopes or fills, or inadequate closure procedures; and
- Loss of growth media during stockpiling or reclamation that would limit revegetation success.

3.8.3.2 Assessment Methodology

Soils were assessed for erosion potential and for potential use as reclamation fill material and topsoil based on the NRCS ratings provided in the SSURGO database or a change in the vegetation community due to a decline in the water table. The analysis criteria that were used to determine these ratings are described above in Study Methods, Section 3.8.2.1. The environmental consequences and impacts described in the following sections are based on these ratings.

3.8.3.3 Proposed Action

Direct impacts to soil resources within the Project Area would result from the disturbance of 8,355 acres under the Proposed Action. Many of the proposed facilities, such as the open pit, WRDFs, LGO stockpile, TSFs, and interpit area, would become permanent topographical features within the Project Area upon completion of the Project. Reclamation activities would include replacing growth media over the stabilized surface of these features prior to revegetation efforts. Growth media would be provided by salvaging and stockpiling the existing soil resources within the Project Area prior to the construction of Project facilities.

T23N R48E
T23N R49E
T23N R50E
T23N R51E
T23N R52E
T23N R53E
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T22N R48E
T22N R49E
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DIAMOND VALLEY
KOBEH VALLEY
278
50

EXPLANATION

- Project Boundary
- Unpaved Road

Soil Erodibility Hazard

Water / Wind

- Severe
- Severe / Moderate
- Moderate / Severe
- Moderate
- Moderate / Slight
- Slight / Moderate
- Slight
- Not Rated
- Phreatophytes within the 10-Foot Drawdown

N

0 1 2 3 4 5 6 7 Miles

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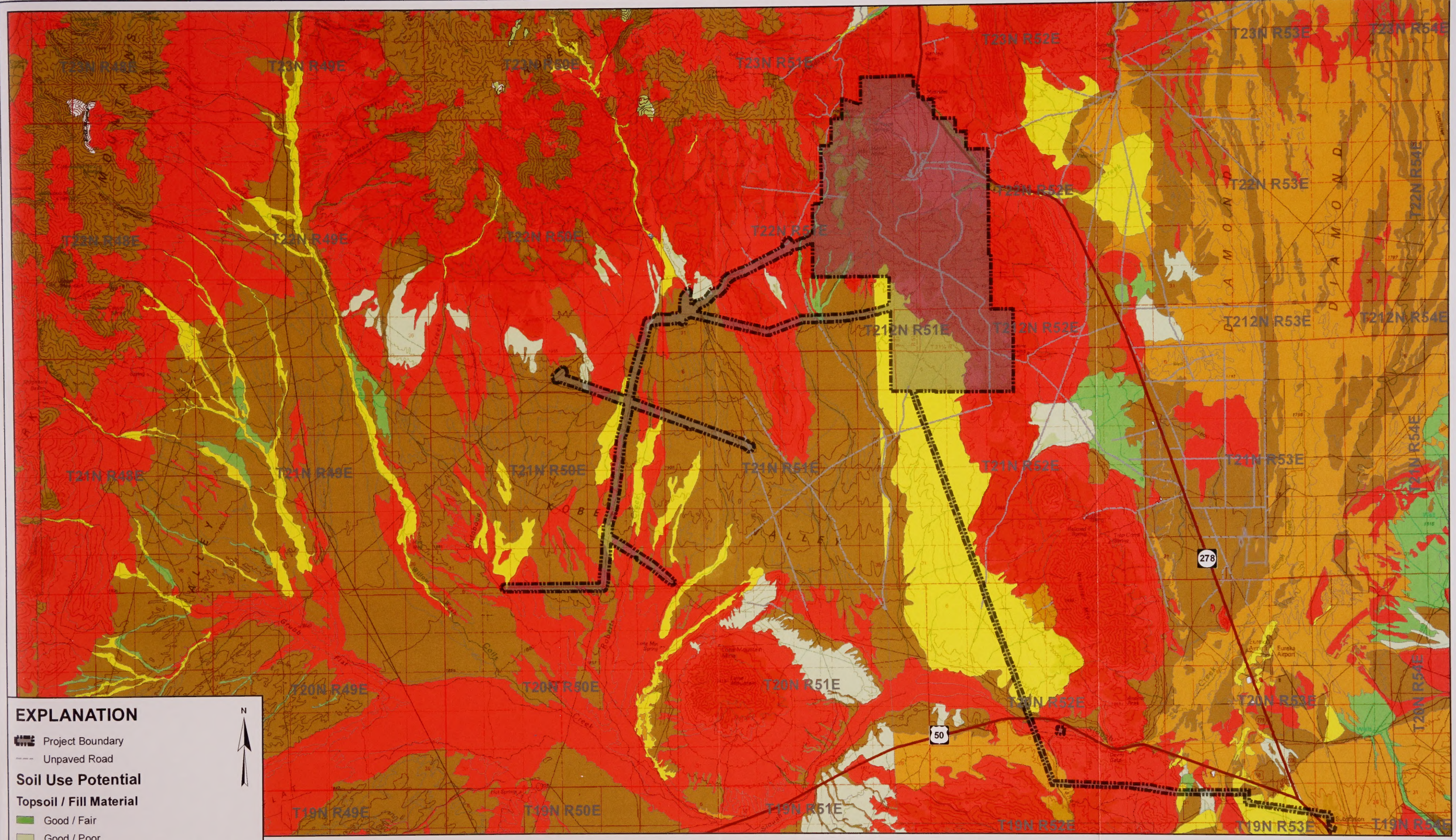
BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Soil Erodibility Hazard in the Project Vicinity

Figure 3.8.2



EXPLANATION

- Project Boundary
- Unpaved Road

Soil Use Potential

Topsoil / Fill Material

- Good / Fair
- Good / Poor
- Fair
- Fair / Poor
- Poor / Fair
- Poor
- Not Rated

N

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BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Potential for Soil Use as Reclamation Fill Material and Topsoil in the Project Vicinity

Figure 3.8.3

Table 3.8-2: Summary of Soil Mapping Units and Characteristics

Mapping Unit	Soil Series	Soil Depth in Inches (Restrictive Feature)	Hydrological Characteristics	Soil Erodibility Hazard	
				By Water	By Wind
Alhambra fine sandy loam (Ab)	Alhambra (100%)	60+ (unknown)	Well drained; high permeability; rarely flooded.	Moderate	Moderate
Atrypa association (AT)	Atrypa (60%)	10 - 20 (paralithic bedrock)	Well drained; moderately high permeability.	Moderate	Slight
	Atrypa (30%)	10 - 20 (paralithic bedrock)	Well drained; moderately high permeability.		
Bartine-Overland association (BA)	Bartine (40%)	20 - 40 (lithic bedrock)	Well drained; moderately high permeability.	Moderate	Moderate
	Overland (40%)	20 - 40 (lithic bedrock)	Well drained; moderately high permeability.		
Dianev silty clay loam (DO)	Dianev (95%)	60+ (unknown)	Somewhat poorly drained, moderately low permeability; rarely flooded; seasonal zone of water saturation March-June.	Severe	Moderate
Kobeh sandy loam (KbA)	Kobeh (100%)	60+ (unknown)	Somewhat excessively drained; high permeability.	Moderate	Moderate
Kobeh gravelly fine sandy loam (KHB)	Kobeh (100%)	60+ (unknown)	Somewhat excessively drained; high permeability.	Slight	Moderate
Labshaft-Rock outcrop complex (LK)	Labshaft (75%)	10 - 20 (lithic bedrock)	Well drained; moderately high permeability.	Slight	Moderate
	Rock outcrop (15%)	0	N/A		
Mau stony loam (MAE)	Mau (100%)	20 - 40 (lithic bedrock)	Well drained; moderately low permeability.	Moderate	Moderate
Nayped loam (NdB)	Nayped (100%)	60+	Well drained; moderately high permeability.	Severe	Moderate
Ratto gravelly fine sandy loam (RAC)	Ratto (100%)	12 - 20 (duripan)	Well drained; moderately low permeability.	Moderate	Moderate
Rubyhill fine sandy loam (RHC)	Rubyhill (100%)	20 - 30 (duripan)	Well drained; moderately high permeability.	Moderate	Moderate
Shipley fine sandy loam (SfB)	Shipley (100%)	60+ (unknown)	Well drained; moderately high permeability.	Moderate	Moderate
Shipley silt loam (ShA)	Shipley (100%)	60+ (unknown)	Well drained; moderately high permeability; rarely flooded.	Severe	Moderate
Shipley complex (Sn)	Shipley variant (60%)	60+ (unknown)	Well drained; moderately high permeability; rarely flooded.	Severe	Moderate
	Shipley (30%)	60+ (unknown)	Well drained; moderately high permeability; rarely flooded.		

Mapping Unit	Soil Series	Soil Depth in Inches (Restrictive Feature)	Hydrological Characteristics	Soil Erodibility Hazard	
				By Water	By Wind
Umil association (US)	Umil (60%)	7 - 14 (duripan)	Well drained; moderately high permeability.	Severe	Moderate
	Umil (30%)	7 - 14 (duripan)	Well drained; moderately high permeability.		
Lien-Hayeston association (111)	Lien (40%)	6 - 14 (duripan)	Well drained, high permeability.	Slight	Moderate
	Lein (30%)	6 - 14 (duripan)	Well drained; high permeability.		
	Hayeston (15%)	60+ (unknown)	Well drained; high permeability; rarely flooded.		
Pedoli-Poorcal association (141)	Pedoli (65%)	60+ (unknown)	Well drained; moderately high permeability.	Moderate	Moderate
	Poorcal (20%)	60+ (unknown)	Well drained; moderately high permeability.		
Pedoli-Shipley association (142)	Pedoli (80%)	60+ (unknown)	Well drained; moderately high permeability.	Moderate	Moderate
	Shipley (15%)	60+ (unknown)	Well drained; moderately high permeability; occasionally flooded.		
Umil loam (201)	Umil (100%)	7 - 14 (duripan)	Well drained; moderately high permeability.	Severe	Moderate
Umil-Hayeston association (202)	Umil (70%)	7 - 14 (duripan)	Well drained; moderately high permeability.	Severe	Moderate
	Hayeston (20%)	60+ (unknown)	Well drained; high permeability; rarely flooded.		
Dianev silt loam (250)	Dianev (95%)	60+ (unknown)	Somewhat poorly drained; moderately low permeability; occasionally flooded; seasonal zone of water saturation March-June.	Severe	Moderate
Poorcal loam (270)	Poorcal (100%)	60+ (unknown)	Well drained; moderately high permeability.	Moderate	Moderate
Coils loam (280)	Coils (100%)	20 - 40 (duripan)	Well drained; moderately low permeability.	Moderate	Moderate
Coils-Umil association (283)	Coils (50%)	20 - 40 (duripan)	Well drained; moderately low permeability.	Moderate	Moderate
	Umil (40%)	7 - 14 (duripan)	Well drained; moderately high permeability.		
Rutab loam (300)	Rutab (100%)	60+ (unknown)	Well drained; moderately high permeability.	Moderate	Moderate
Mau-Shagnasty-Eightmile association (321)	Mau (45%)	20 - 40 (lithic bedrock)	Well drained; moderately low permeability.	Moderate	Moderate
	Shagnasty (30%)	50 - 60 (paralithic bedrock)	Well drained; moderately low permeability.		

Mapping Unit	Soil Series	Soil Depth in Inches (Restrictive Feature)	Hydrological Characteristics	Soil Erodibility Hazard	
				By Water	By Wind
	Eightmile (15%)	6 - 14 (paralithic bedrock)	Well drained; moderately high permeability.		
Hopeka-Solak-Ados association (330)	Hopeka (45%)	4 - 10 (lithic bedrock)	Well drained; moderately high permeability.	Moderate	Moderate
	Solak (25%)	10 - 20 (lithic bedrock)	Somewhat excessively drained; moderately high permeability.		
	Ados (15%)	30 - 40 (lithic bedrock)	Well drained; moderately high permeability.		
Hopeka-Solak-Rock outcrop association (331)	Hopeka (40%)	4 - 10 (lithic bedrock)	Well drained; moderately high permeability.	Moderate	Moderate
	Solak (35%)	10 - 20 (lithic bedrock)	Somewhat excessively drained; moderately high permeability.		
	Rock outcrop (10%)	0	N/A		
Kobeh gravelly loam (370)	Kobeh (100%)	60+ (unknown)	Somewhat excessively drained; moderately high permeability.	Moderate	Moderate
Beanflat silt loam (410)	Beanflat (100%)	60+ (unknown)	Somewhat poorly drained; moderately high permeability; occasionally flooded; seasonal zone of water saturation December-May.	Severe	Moderate
Akercan loam (440)	Akercan (100%)	60+ (unknown)	Well drained; moderately high permeability.	Moderate	Moderate
Hayeston sandy loam (590)	Hayeston (100%)	60+ (unknown)	Well drained; high permeability; rarely flooded.	Moderate	Moderate
Rubyhill sandy loam (600)	Rubyhill (100%)	20 - 30 (duripan)	Well drained; moderately high permeability.	Moderate	Moderate
Rubyhill-Barrier association (601)	Rubyhill (60%)	20 - 30 (duripan)	Well drained; moderately high permeability.	Moderate	Moderate
	Barrier (25%)	10 - 20 (duripan)	Well drained; moderately high permeability.		
Silverado sandy loam (620)	Silverado (100%)	60+ (unknown)	Well drained; high permeability.	Moderate	Moderate
Silverado sandy loam (621)	Silverado (100%)	60+ (unknown)	Well drained; high permeability.	Moderate	Moderate
Jesse Camp silt loam (630)	Jesse Camp (100%)	60+ (unknown)	Well drained; moderately high permeability; rarely flooded.	Severe	Moderate
Akerue-Simpark-Robson association (661)	Akerue (40%)	15 - 26 (lithic bedrock)	Well drained; moderately low permeability.	Slight	Slight
	Simpark (35%)	20 - 30 (lithic bedrock)	Well drained; moderately high permeability.		
	Robson (10%)	12 - 20 (lithic bedrock)	Well drained; moderately low permeability.		

Mapping Unit	Soil Series	Soil Depth in Inches (Restrictive Feature)	Hydrological Characteristics	Soil Erodibility Hazard	
				By Water	By Wind
Chad-Cleavage-Softscrabble association (681)	Chad (45%)	40 - 60 (paralithic bedrock)	Well drained; moderately low permeability.	Moderate	Moderate
	Cleavage (20%)	14 - 20 (lithic bedrock)	Well drained; moderately high permeability.		
	Softscrabble (20%)	60+ (unknown)	Well drained; moderately low permeability.		
Shagnasty-Ravenswood-Rock outcrop association (764)	Shagnasty (45%)	50 - 60 (paralithic bedrock)	Well drained; moderately low permeability.	Slight	Slight
	Ravenswood (25%)	30 - 40 (lithic bedrock)	Well drained; moderately low permeability.		
	Rock outcrop (15%)	0	N/A		
Welch loam (770)	Welch (95%)	60+ (unknown)	Well drained; moderately high permeability; occasionally flooded; seasonal zone of water saturation February-May.	Moderate	Moderate
Atrypa gravelly loam (830)	Atrypa (100%)	10 - 20 (paralithic bedrock)	Well drained; moderately high permeability.	Moderate	Slight
Atrypa-Mau association (831)	Atrypa (75%)	10 - 20 (paralithic bedrock)	Well drained; moderately high permeability.	Moderate	Slight
	Mau (15%)	20 - 40 (lithic bedrock)	Well drained; moderately low permeability.		
Fortank very stony loam (870)	Fortank (100%)	30 - 40 (paralithic bedrock)	Well drained; moderately low permeability.	Slight	Slight
Handy loam (922)	Handy (100%)	60+ (unknown)	Well drained; moderately low permeability.	Moderate	Moderate
Bubus loam (1010)	Bubus (100%)	60+ (unknown)	Well drained; moderately high permeability.	Severe	Moderate

Shaded rows denote mapping units that occur in the Diamond Valley Area, including portions of Eureka, Elko, and White Pine Counties. All other mapping units occur in the Eureka County Area.

Up to 21 million yd^3 of soil material could be salvaged from the disturbance footprint of Project facilities and stockpiled for use as interim and final reclamation cover material and growth media. Soil would be stripped from targeted soil units based on analyses of the NRCS soil mapping database and previous and proposed field testing. Salvaged soils would be stockpiled and designated as strictly organic, inorganic, or a mixture of both. Organic soils would be used as growth media topsoils, while the inorganic material would be stockpiled for use as cover material. Organic and inorganic growth media may be mixed if sufficient amounts of inorganic material are stockpiled for use as engineered cover. Soil and growth media stockpiles would have a higher erosion potential than the natural environment due to the potential for decreased soil compaction, increased slope gradients, and the loss of stabilizing vegetation cover. Growth

media stockpiles would be stabilized and revegetated following the removal of material for the reclamation of other facilities during final reclamation activities.

Soil erosion potential for other areas of disturbance within the Project Area would also be higher than the natural environment. The construction of sloped facilities, such as the WRDFs, LGO Stockpile, TSFs, and open pit, would increase the erodibility hazard of soils until the completion of stabilization and revegetation activities during reclamation. The construction of other features, including the yards and processing facilities, haul, secondary, and exploration roads, pipeline and powerline corridors, sediment control structures, water supply facilities, other ancillary facilities, and mineral exploration, would also increase the erosion potential of soils within the Project Area. Final reclamation activities under the Proposed Action would include the stabilization and revegetation of all disturbed areas within the Project Area. An indirect effect **to soils** could **occur as a result of** the decline in the water table in Kobeh Valley due to the pumping of ground water for mine operations. This decline in the water table could **result in a shift from a more hydric soil to a more xeric soil. This change in soil conditions could result in a shift in species composition and percent cover of phreatophytic vegetation in Kobeh Valley (Cooper et al. 2006). This would result in a change in vegetation species composition and percent cover; however, this change should not result in a net loss of vegetation sufficient to increase soil erosion.** An additional indirect effect would occur if fissures develop as a result of subsidence associated with the ground water pumping. If fissures develop (see Section 3.2.3) and surface water run-off is captured by the fissures, then the adjacent soils would be eroded into the fissures.

Potential increases in the soil erodibility hazard within the Project Area would be reduced by the implementation of **applicant** committed **practices** and BMPs by the applicant. Erosion and the sedimentation of precipitation runoff would be reduced through the diversion and routing of storm water around Project facilities and the construction of runoff controls (e.g., berms) and sediment collection ponds to protect downstream water quality. Potential wind and water erosion would be reduced by the placement of protective rock and gravel cover. Following construction, areas such as cut and fill embankments and growth media stockpiles would be seeded as soon as practicable and safe to provide vegetation cover that would also reduce wind and water erosion potential. Concurrent reclamation would be maximized to the extent practicable to accelerate the revegetation of disturbed areas. All sediment and erosion control measures would be inspected periodically and repairs or maintenance performed as necessary.

- **Impact 3.8.3.3-1:** Based on the 8,355 acres of direct disturbance of soils and the potential indirect effect to soils in Kobeh Valley as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur under the Proposed Action due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

  Significance of the Impact: Based upon the implementation of **applicant committed practices**, BMPs, and reclamation activities, this impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Potential impacts to soil resources within the Project Area would also include the loss of suitable growth media necessary for the successful reclamation of areas disturbed under the Proposed

Action. Reclamation under the Proposed Action would require the re-establishment of vegetation communities consistent with the pre-mining environment. To achieve this, reclamation activities would include the replacement of growth media, of suitable quality, over disturbed areas prior to revegetation efforts. Table 2.1-8 shows that at least 14.3 million yd^3 of material would be needed to reclaim the disturbed areas within the Project Area.

As described above, up to 21 million yd^3 of growth media could be stripped and stockpiled under the Proposed Action. This estimate takes into consideration a predicted ten percent material loss during the salvaging and stockpiling process. Growth media would be stripped during the development of the mine open pit and during construction of the WRDFs and TSFs. The characterization, salvage technique, and stockpiling of growth media would be carried out under the GMMP included in Appendix 10 of the Plan. The GMMP would be a living document that would be implemented to ensure sufficient quantities of suitable growth media are salvaged during the development and operation of the Project. The GMMP includes discussions on proper salvage criteria and techniques, stockpile construction and management practices, storm water and erosion control measures, growth media inventory practices and record keeping, and safety considerations. Under the GMMP, alluvium is considered suitable growth media under the Proposed Action; however, this should not significantly affect growth media quality since the majority of the soils that exist within the Project Area are rated "poor" by the NRCS for use as reclamation topsoil.

- **Impact 3.8.3.3-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the Proposed Action.

  Significance of the Impact: Based upon the implementation of the GMMP, this impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Soil horizon formation is a function of a range of geological, chemical, and biological processes that occur over very long time periods. Surface layer soils typically have higher organic matter content and contain higher nutrient levels than subsurface soils. Project-related surface disturbance, including the stripping of growth media, as described above, would inherently include the unavoidable impact of mixing existing soil horizons as soil is removed, transported, and stockpiled for use during reclamation. Soil biological activity and nutrient cycling would be substantially reduced or eliminated during stockpiling as a result of anaerobic conditions created in deeper portions of the stockpiles; therefore, growth media and cover replaced on Project facilities may not exhibit the level of soil productivity that the naturally occurring soil horizon stratigraphy provides.

The NRCS has rated the majority of the soils within the Project Area as "poor" for use as topsoil. This indicates that the disruption of the naturally occurring soil horizons would not significantly impact the pre-existing soil productivity. Furthermore, previous successful mine reclamation projects utilizing growth media salvaging techniques similar to the Proposed Action have shown that the effectiveness of the soil material to function as growth media is not significantly diminished as a result of stockpiling (Imus 1992).

- **Impact 3.8.3.3-3:** Surface disturbance activities under the Proposed Action would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

  Significance of the Impact: Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Proposed Action, this impact is considered less than significant, and no further mitigation measures are proposed.

3.8.3.3.1 Residual Adverse Impacts

Implementation of the Proposed Action would result in the unintentional and unavoidable loss of minor amounts of growth media during the salvaging process; however, this impact is mitigated by the ten percent loss consideration used to estimate the total amount of growth media that would be salvaged under the Proposed Action. Furthermore, minor degradation in soil stability and productivity may result from the physical processes of stripping, stockpiling, and replacing growth media over the course of the Project lifespan.

3.8.3.4 No Action Alternative

Under the No Action Alternative, the Proposed Action would not take place; however, EML has **seven** Notices that authorize exploration activities to take place within the Project Area, allowing a total of 35 acres of surface disturbance. This disturbance would be isolated and scattered throughout the Project Area; therefore, under the No Action Alternative, impacts to soil resources caused by surface disturbance would be reduced from 8,355 acres to 35 acres. The impacts discussed under the Proposed Action, including soil erosion and stability impacts, availability of growth media for use during reclamation, and the mixing of existing soil horizons, would be significantly reduced, if not eliminated, under the No Action Alternative. The impact to soil productivity from potential PAG rock infiltration and metal leaching would be eliminated entirely under the No Action Alternative.

- **Impact 3.8.3.4-1:** Based on the 35 acres of direct effects to soils, accelerated soil erosion rates may occur under the No Action Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

  Significance of the Impact: Based upon the implementation of **applicant committed practices**, BMPs, reclamation activities, and the insignificant amount of surface disturbance that would be caused by the No Action Alternative, this impact is considered less than significant, and no further mitigation measures are proposed.

- **Impact 3.8.3.4-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the No Action Alternative.

  Significance of the Impact: Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the No Action Alternative, this impact is considered less than significant, and no further mitigation measures are proposed.

- **Impact 3.8.3.4-3:** Surface disturbing activities under the No Action Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

  Significance of the Impact: Based upon the pre-existing soil conditions and the insignificant amount of surface disturbance that would be caused by the No Action Alternative, this impact is considered less than significant, and no further mitigation measures are proposed.

3.8.3.4.1 Residual Adverse Impacts

Residual adverse impacts to soil resources under the No Action Alternative would correspond to, but significantly less than, those described under the Proposed Action.

3.8.3.5 Partial Backfill Alternative

The impacts to soil resources under the Partial Backfill Alternative would be nearly identical to those described under the Proposed Action. Under the Partial Backfill Alternative, all Project operations would be carried out as described under the Proposed Action, creating the same amount of surface disturbance (8,355 acres) and associated direct and indirect effects; however, the Partial Backfill Alternative would create approximately 527 acres of surface disturbance that would require reclamation as the open pit is backfilled to a grade above the ground water level that would otherwise form a lake under the Proposed Action. Backfill material would be supplied from the Non-PAG WRDF such that all Non-PAG rock would be replaced into the open pit. The backfilled surface would then be reclaimed by replacing growth media prior to revegetation. Similar to the Proposed Action, an indirect effect **to** soils **could occur as a result of the decline in** the water table in Kobeh Valley due to the pumping of ground water for mine operations. This decline in the water table could **result in a shift from a more hydric soil to a more xeric soil. This change in soil conditions could result in a shift in species composition and percent cover; however, this change should not result in a net loss of vegetation sufficient to increase soil erosion**. An additional indirect effect would occur if fissures develop as a result of subsidence associated with the ground water pumping. If fissures develop (see Section 3.2.3) and surface water run-off is captured by the fissures, then the adjacent soils would be eroded into the fissures.

- **Impact 3.8.3.5-1:** Based on the 8,355 acres of direct disturbance of soils and the potential indirect effect to soils in Kobeh Valley as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur under the Partial Backfill Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

  Significance of the Impact: Based upon the implementation of **applicant committed practices**, BMPs, and reclamation activities, this impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The Partial Backfill Alternative would alter the amount of growth media required for reclamation activities such that the 527-acre, backfilled, open pit bottom would be covered and reclaimed in a manner consistent with the rest of the Project facilities described under the Proposed Action; therefore, an additional 1.7 million yd^3 of growth media would be required to complete the reclamation process under the Partial Backfill Alternative. Growth media would still be required to cover the foundation of the PAG disposal facility and the remaining Non-PAG waste rock at the completion of the backfilling process.

The same amount of growth media (21 million yd^3) would be salvaged and stockpiled under the Partial Backfill Alternative as under the Proposed Action. This amount of material would be sufficient to provide cover for the reclamation of the facilities described under the Proposed Action with an estimated six million yd^3 of growth media remaining. Since it would only require 1.7 million yd^3 of material to cover the additional 527 acres of the backfilled mine pit bottom, there would be no significant impact to growth media availability for use during reclamation under the Partial Backfill Alternative.

- **Impact 3.8.3.5-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the Partial Backfill Alternative.

  Significance of the Impact: Based upon the implementation of the GMMP, which would provide sufficient growth media for use during reclamation of the additional 527 acres required under the Partial Backfill Alternative, this impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Surface disturbance and the construction of Project facilities would be identical under the Partial Backfill Alternative and the Proposed Action; therefore, the impacts to soil resources within the Project Area regarding soil horizon mixing would be the same under the Partial Backfill Alternative as those under the Proposed Action.

- **Impact 3.8.3.5-3:** Surface disturbing activities under the Partial Backfill Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

  Significance of the Impact: Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Partial Backfill Alternative, this impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.8.3.5.1 Residual Adverse Impacts

Residual adverse impacts to soil resources under the Partial Backfill Alternative would be identical to those described under the Proposed Action.

3.8.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

The impacts to soil resources, both direct and indirect, within and adjacent to the Project Area would be the same under the Off-Site Transfer of Ore Concentrate for Processing Alternative as those described under the Proposed Action. Surface disturbance and the construction of Project facilities would be identical under both alternatives with the exception of 20 acres of surface disturbance associated with the TMO and FeMo processing facilities. These facilities would not be constructed under the Off-Site Transfer of Ore Concentrate for Processing Alternative, thereby reducing the total Project-related surface disturbance to approximately **8,315** acres; therefore, under the Off-Site Transfer of Ore Concentrate for Processing Alternative, the potential impacts to soil resources would be approximately 20 acres less than those under the Proposed Action. Similar to the Proposed Action, an indirect effect **to** soils **could occur as a result of** the decline in the water table in Kobeh Valley due to the pumping of ground water for mine operations. This decline in the water table could **result in a shift from a more hydric soil to a more xeric soil. This change in soil conditions could result in a shift in species composition and percent cover; however, this change should not result in a net loss of vegetation sufficient to increase soil erosion.** An additional indirect effect would occur if fissures develop as a result of subsidence associated with the ground water pumping. If fissures develop (see Section 3.2.3) and surface water run-off is captured by the fissures, then the adjacent soils would be eroded into the fissures.

- **Impact 3.8.3.6-1:** Based on the **8,315** acres of direct disturbance of soils and the potential indirect effect to soils in Kobeh Valley as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur under the Off-Site Transfer of Ore Concentrate for Processing Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

  Significance of the Impact: Based upon the implementation of **applicant committed practices**, BMPs, and reclamation activities, this impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.8.3.6-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the Off-Site Transfer of Ore Concentrate for Processing Alternative.

  Significance of the Impact: Based upon the implementation of the GMMP, this impact is not considered.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.8.3.6-3:** Surface disturbance activities under the Off-Site Transfer of Ore Concentrate for Processing Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

Significance of the Impact: Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Off-Site Transfer of Ore Concentrate for Processing Alternative, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.8.3.6.1 Residual Adverse Impacts

Residual adverse impacts to soil resources under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be identical to those described under the Proposed Action.

3.8.3.7 Slower, Longer Project Alternative

Impacts to soils from the Slower, Longer Project Alternative are expected to be similar to impacts from the Proposed Action at the end of the Project; however, impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action. **Similar to the Proposed Action, a**n indirect effect **to** soils **could occur as a result of** the decline in the water table in Kobeh Valley due to the pumping of ground water for mine operations. This decline in the water table could **result in a shift from a more hydric soil to a more xeric soil. This change in soil conditions could result in a shift in species composition and percent cover; however, this change should not result in a net loss of vegetation sufficient to increase soil erosion.** An additional indirect effect would occur if fissures develop as a result of subsidence associated with the ground water pumping. If fissures develop (see Section 3.2.3) and surface water run-off is captured by the fissures, then the adjacent soils would be eroded into the fissures.

- **Impact 3.8.3.7-1:** Based on the 8,355 acres of direct disturbance of soils and the potential indirect effect to soils in Kobeh Valley as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur under the Slower, Longer Project Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

  Significance of the Impact: Based upon the implementation of **applicant committed practices**, BMPs, and reclamation activities, this impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.8.3.7-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the Slower, Longer Project Alternative.

  Significance of the Impact: Based upon the implementation of the GMMP, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.8.3.7-3:** Surface disturbance activities under the Slower, Longer Project Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

  Significance of the Impact: Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Slower, Longer Project Alternative, this impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.8.3.7.1 Residual Adverse Impacts

Residual adverse impacts to soil resources under the Slower, Longer Project Alternative would be similar to those described under the Proposed Action. However, accelerated soil erosion rates may occur under the Slower, Longer Project Alternative for a longer duration of proposed activities relative to the Proposed Action.

3.9 Vegetation Resources

This section addresses vegetation resources in and near the Project Area including information on plant communities. Wetland and riparian areas are discussed in Section 3.11.

3.9.1 Regulatory Framework

3.9.1.1 Endangered Species Act

The Federal ESA of 1973, as amended, safeguards the continued existence of any species classified as "endangered" or "threatened," as well as habitat that is determined by the Secretary of the Interior to be critical to such species. The ESA is administered by the USFWS, in consultation with other federal and state agencies. The ESA defines the following terms:

- Endangered species: "... any species which is in danger of extinction throughout all or a significant portion of its range..."
- Threatened species: "... any species which is likely to become an endangered species within the foreseeable future..."
- Critical habitat: "... the specific areas within the geographical area occupied by the species... on which are found those physical or biological features (i) essential to the conservation of the species, and (ii) which may require special management considerations or protection..."

The ESA prohibits the "take" (i.e., killing, harming, or harassment) of listed threatened or endangered species without special exemptions. Candidate species are species for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Analogous to the ESA,

NRS 527.270 prohibits removal or destruction of species listed as "threatened with extinction" except by special permit from the Nevada Division of Forestry (NDF).

In addition to listed threatened, endangered, and candidate species, the USFWS identifies another group of species known as species of concern (formerly candidate, category 2 species). Species of concern are not specifically afforded the same protection under the ESA as threatened and endangered species, but federal agencies are required to afford them consideration in planning and decision-making processes. The BLM evaluates species of concern in a manner analogous to threatened and endangered species. On May 1, 1996, the NSO incorporated all former USFWS-designated category 2 candidate species into the Nevada Special Status Species List and classified them as sensitive. Sensitive species are protected by BLM policy, which requires that actions authorized, funded, or carried out by the agency do not contribute to the listing of any candidate or sensitive species as threatened or endangered under the ESA. A list of **BMDO** BLM sensitive species is included as Appendix **G**.

3.9.1.2 Nevada Natural Heritage Program

The Nevada Natural Heritage Program (NNHP) maintains a computerized inventory of information on the general location and status of Nevada's sensitive plants, animals, and natural biological communities. The NNHP tracks state and federally protected species as well as species that the scientific community considers deserving of official listing. The information is derived from reported sightings only, and does not cover every project location.

3.9.1.3 Nevada Native Plant Society

The Nevada Native Plant Society (NNPS) is a non-profit organization that functions in an advisory capacity to state and federal agencies regarding Nevada native plants and their distributions. The NNPS has created six categorical designations of plants to identify their respective concern for these species. These designations do not afford legal status or protection for the species, but the lists produced by NNPS are utilized by agencies in their planning processes for activities that may impact the species or habitat. The listing categories include the following:

- Endangered: Believed to meet the ESA definition of endangered.
- Threatened: Believed to meet the ESA definition of threatened.
- Watch-list: Potentially vulnerable to becoming threatened or endangered.
- Possibly Extirpated: Historically native to Nevada, but may no longer survive in the wild.
- Absent: Currently and historically absent from Nevada, listed in the past but not now of concern.
- Delisted: Dropped from consideration, no longer of concern to NNPS.

3.9.2 Affected Environment

3.9.2.1 Study Methods

The NRCS soil surveys were reviewed to obtain existing vegetation data for the area and potential natural vegetation and ecological site descriptions (SRK 2007b). A gross scale mapping effort of the vegetation in the majority of the Project was conducted by aerial survey (helicopter) on April 28, 2006, and ground surveys (SRK 2007b). Figure 3.9.1 shows the vegetation types in

the Project Area. An additional survey for biological resources, including vegetation, was conducted on July 1 and 2, 2008 (Great Basin Ecology 2008). Phreatophytic vegetation was mapped in the Project Area and vicinity and is shown on Figures 3.2.20 and 3.9.2.

Baseline survey information for special status species in the Project Area was requested from the NNHP and the USFWS. The lists provided by the NNHP and the USFWS identified the following plant species with potential to occur within the region: Beatley buckwheat (*Eriogonum beatleyae*), an imperiled species; and least phacelia (*Phacelia minutissima*), a BLM sensitive species. Additionally, windloving buckwheat (*Eriogonum anemophilum*), a BLM sensitive species, was identified as potentially occurring in the Kobeh Valley portion of the Project Area. The Monte Neva Indian paintbrush (*Castilleja salsuginosa*), a BLM sensitive species, is located approximately two miles southwest of the southern extent of the ten-foot drawdown.

Special status plant surveys were conducted in the majority of the Project Area by SRK on June 30, 2005, and during the bloom period in 2006 (SRK 2007b). Field surveys were also conducted in the well field, powerline, and transmission line areas in mid-July and August 2007 (SRK 2007c). A final special status plant survey in the Kobeh Valley portion of the Project Area was conducted on July 1 and 2, 2008 (Great Basin Ecology 2008). Vegetation in the powerline portion of the Project Area was obtained from the Southwest Regional Gap Analysis Project database maintained by the EPA (http://www.epa.gov/ nerlesd1/land-sci/gap.htm).

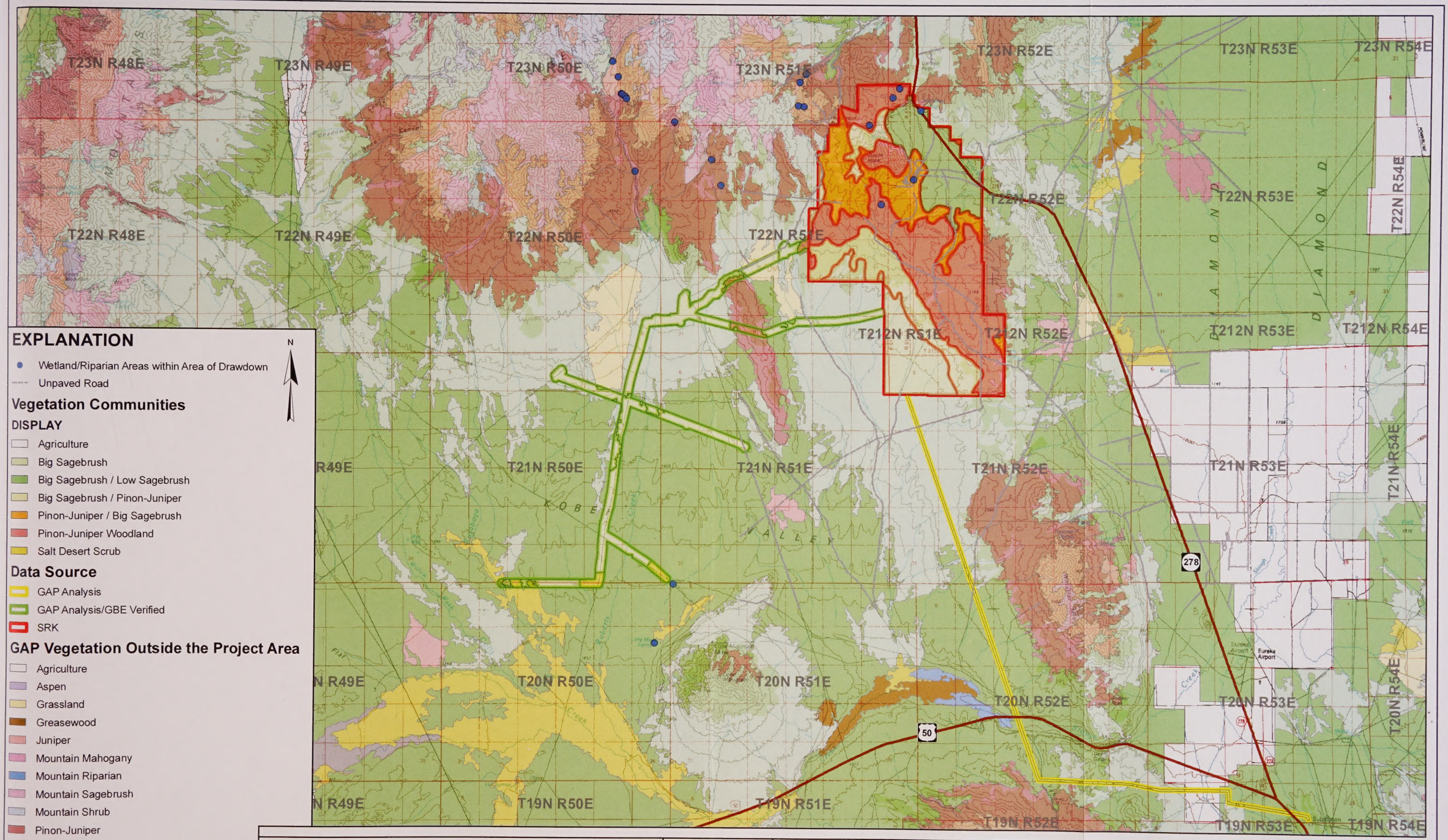
3.9.2.2 Existing Conditions

3.9.2.2.1 Vegetation Community Types

Vegetation community types identified within the Project Area include the following: big sagebrush; piñon-juniper woodland; big sagebrush/piñon-juniper; piñon-juniper/big sagebrush; big sagebrush/low sagebrush; salt desert scrub; juniper; and agricultural lands (Figure 3.9.1). Table 3.9-1 summarizes the vegetation community types located within the Project Area. **The Project Area is located within the Central Nevada Basin and Range (NRCS 028B) MLRA.**

Table 3.9-1: Vegetation Community Types within the Project Area

Vegetation Community	Elevational Range (feet amsl)	Acres within the Project Area	Percent within the Project Area
Piñon-Juniper	6,200-8,600	6,896.8	30.1
Big sagebrush	5,700-8,600	7,115.3	31.1
Big Sagebrush/Piñon-Juniper	5,500-7,500	2,996.1	13.1
Piñon-Juniper/Big Sagebrush	6,200-7,000	2,902.3	12.7
Big Sagebrush/Low Sagebrush	5,900-6,800	2,643.2	11.5
Salt Desert Scrub	5,900-6,200	261.4	1.1
Agricultural Land	6,014-6,043	70.4	0.3
Total	NA	22,885.6	100



EXPLANATION

N

- Wetland/Riparian Areas within Area of Drawdown
- Unpaved Road

Vegetation Communities

DISPLAY

- Agriculture
- Big Sagebrush
- Big Sagebrush / Low Sagebrush
- Big Sagebrush / Pinon-Juniper
- Pinon-Juniper / Big Sagebrush
- Pinon-Juniper Woodland
- Salt Desert Scrub

Data Source

- GAP Analysis
- GAP Analysis/GBE Verified
- SRK

GAP Vegetation Outside the Project Area

- Agriculture
- Aspen
- Grassland
- Greasewood
- Juniper
- Mountain Mahogany
- Mountain Riparian
- Mountain Sagebrush
- Mountain Shrub
- Pinon-Juniper
- Pinon
- Playas
- Sagebrush
- Sagebrush/Perennial Grass
- Salt Desert Scrub

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0 1 2 3 4 5 6 7 Miles

IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

DESIGN:	EMLLC	DRAWN:	CVD/GSL	REVIEWED:	RFD
CHECKED:	-	APPROVED:	RFD	DATE:	07/29/2011

FILE NAME: p1635_Fig3-9-1_Vegetation.mxd

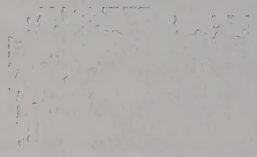
BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Vegetation Communities and Wetland/Riparian Areas

Figure 3.9.1



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

EXPLANATION

Phreatophytes

- Mainly Greasewood and Rabbitbrush
- Mainly Saltgrass and Meadow Grasses
- Playa
- Springs
- Perennial Streams
- 10-Foot Drawdown Maximum Extent
- Project Area Boundary

N

0 1 2 3 4 5 Miles

DESIGN: EMLLC	DRAWN: GSL	REVIEWED: RFD	
CHECKED: -	APPROVED: -	DATE: 07/31/2012	
FILE NAME: p1635_Fig3-9-2_Phreatophytes.mxd			

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

DRAWING TITLE:

Existing Phreatophyte Vegetation

Figure 3.9.2

According to the NRCS, this MLRA 028B supports saltbush-greasewood, big sagebrush, and piñon-juniper woodland vegetation in the progression from low to high ranges in elevation. Shadscale saltbush (*Atriplex confertifolia*), in association with bud sagebrush (*Artemisia spinescens*), spiny hopsage (*Grayia spinosa)*, ephedra (*Ephedra* sp.), winterfat, (*Krascheninnikovia lanata*), fourwing saltbush (*Atriplex canescens*), Indian ricegrass (*Achnatherum hymenoides*), bottlebrush squirreltail (*Elymus elymoides*), and galleta (*Pleuraphis* sp.), characterize the saltbush-greasewood type (NRCS 2012b). As moisture increases, plants associated with shadscale are replaced by needlegrass, bluegrass, bluebunch or beardless wheatgrass (*Pseudoroegneria spicata*), basin wildrye (*Leymus cinereus*), and forbs. Black greasewood (*Sarcobatus vermiculatus*) and Nuttall saltbush (*Atriplex nuttallii*) are noted to be important on some sites. Big sagebrush and black sagebrush (*Artemisia nova*), which grow on soils that are shallow to an indurated pan or to bedrock, are potentially dominant. In the piñon-juniper woodland, bitterbrush (*Purshia tridentata*), serviceberry (*Amelanchier* sp.), and snowberry (*Symphoricarpos* sp.) grow in association with Utah juniper and singleleaf piñon. The highest elevations support thickets of curl-leaf mountain mahogany (*Cercocarpus ledifolius*) and small amounts of mixed conifer forest with limber, bristlecone (*Pinus aristata*), or ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), or white fir (*Abies concolor*). On bottom lands, basin wildrye, creeping wildrye (*Leymus triticoides*), alkali sacaton (*Sporobolus airoides*), wheatgrasses, bluegrasses, sedges (*Carex* spp.), and rushes (*Juncus* spp.) are typical. Black greasewood, rubber rabbitbrush (*Ericameria nauseosa*), and big sagebrush grow on the drier sites. Inland saltgrass, alkali sacaton, black greasewood, rubber rabbitbrush, and saltbush typify the vegetation on strongly saline-alkali soils (NRCS 2012b).

Table 3.9-2 includes a list of ecological sites by vegetation community types within the Project Area. Table 3.9-3 includes the potential native vegetation including percent composition by growth habit for the ecological sites located in the Project Area.

Table 3.9-2: Ecological Sites by Vegetation Community Type within the Project Area

Ecological Site	Ecological Site Numbers	Vegetation Community Type in the Project Area						
		Piñon-Juniper	Big Sagebrush	Big Sagebrush/ Piñon-Juniper	Piñon-Juniper/ Big Sagebrush	Big Sagebrush/ Low Sagebrush	Salt Desert Scrub	Agricult-ural Land
Loamy (8-10" P.Z.)	R028BY010 NV	X	X	X	X	X	X	X
Loamy (10-12" P.Z.)	R028BY007 NV	X		X	X			
Loamy bottom (10-14" P.Z.)	R028BY003 NV		X				X	
Saline bottom	R028BY004 NV		X				X	
Sodic terrace (6-8" P.Z.)	R024XY003 NV						X	
Sodic flat	R028BY020		X					

Ecological Site	Ecological Site Numbers	Vegetation Community Type in the Project Area						
		Piñon-Juniper	Big Sagebrush	Big Sagebrush/ Piñon-Juniper	Piñon-Juniper/ Big Sagebrush	Big Sagebrush/ Low Sagebrush	Salt Desert Scrub	Agricult-ural Land
(5-8" P.Z.)	NV							
Silty (8-10" P.Z.)	R028BY013 NV							X
Shallow calcareous loam (8-10" P.Z.)	R028BY011 NV		X					
Shallow calcareous slope (8-10" P.Z.)	R028BY016 NV	X	X					
Shallow calcareous slope (14"+ P.Z.)	R028BY027 NV	X	X	X	X			

Table 3.9-3: Ecological Site within the Project Area

Ecological Site	Potential Native Vegetation Species	Percent Composition by Growth Habit
Loamy (8-10" P.Z.)	Wyoming big sagebrush, Indian ricegrass, and needleandthread	50 percent grasses, 5 percent forbs, and 45 percent shrubs and trees
Loamy (10-12" P.Z.)	Thurber's needlegrass, bluebunch wheatgrass, and big sagebrush	65 percent grasses, 10 percent forbs, and 25 percent shrubs and trees
Loamy bottom (10-14" P.Z.)	Basin wildrye	85 percent grasses, 5 percent forbs, and 10 percent shrubs
Saline bottom	Basin wildrye and alkali sacaton	80 percent grasses, 5 percent forbs, and 15 percent shrubs
Sodic terrace (6-8" P.Z.)	Shadscale, black greasewood, and bottlebrush squirreltail	10 percent grasses, 5 percent forbs, and 85 percent shrubs
Sodic flat (5-8" P.Z.)	Black greasewood, alkali sacaton, and inland saltgrass	15 percent grasses, 5 percent forbs, and 80 percent shrubs
Silty (8-10" P.Z.)	Winterfat and Indian ricegrass	30 percent grasses, 5 percent forbs, and 65 percent shrubs
Shallow calcareous loam (8-10" P.Z.)	Black sagebrush, Indian ricegrass, and needleandthread	40 percent grasses, 5 percent forbs, and 55 percent shrubs and trees
Shallow calcareous slope (8-10" P.Z.)	Black sagebrush, Indian ricegrass, and needleandthread	40 percent grasses, 5 percent forbs, and 55 percent shrubs
Shallow calcareous slope (14"+ P.Z.)	Bluebunch wheatgrass and black sagebrush	65 percent grasses, 10 percent forbs, and 25 percent shrubs

Big Sagebrush Vegetation Type

The big sagebrush vegetation type is present on alluvial fans, hillsides, and ephemeral drainages and occurs in Akercan (440), Coils (280), Labshaft-Rock, and Rubyhill-Barrier (601) associations found within the Project Area. All soil associations within the Project Area are described in Section 3.8. This vegetation type occurs at elevations between 5,700 and 8,600 feet amsl. The existing dominant overstory vegetation, depending on the location, could be either basin big sagebrush (*Artemisia tridentata* spp. *tridentata*), Wyoming big sagebrush, or mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*). Understory species commonly associated with basin big sagebrush includes bottlebrush squirreltail (*Elymus elymoides*), rabbitbrush (*Ericameria nauseosa* and *Chrysothamnus* ssp.), and Sandberg bluegrass (*Poa secunda*).

Rabbitbrush, Indian ricegrass, green ephedra (*Ephedra viridis*), and cheatgrass occur with Wyoming big sagebrush. Species occurring with mountain big sagebrush include bluebunch wheatgrass, Sandberg bluegrass, cheatgrass, bottlebrush squirreltail, lupine (*Lupinus* spp.), and scattered rabbitbrush and antelope bitterbrush (*Purshia tridentata*). The big sagebrush type is a prevalent vegetation type accounting for 7,**115.3** acres (**31.1** percent) of the Project Area and generally dominates the lower to mid-elevation zones in the Kobeh Valley and along Garden Pass Road.

Based on the NRCS soil surveys and ecological site descriptions for upland vegetation communities, the current vegetation type is more shrub dominated than the potential natural vegetation described in the ecological site description (SRK 2007b). For most ecological sites in this type, grass species have the potential to comprise over 50 percent of vegetative composition with shrubs being at or below 50 percent of the total composition. Species composition is extremely similar to the potential natural vegetation species; however, percentages of composition are skewed toward shrub dominance. Big sagebrush, antelope bitterbrush, rabbitbrush, bluebunch wheatgrass, Indian ricegrass, Thurber's needlegrass (*Achnatherum thurberianum*), bottlebrush squirreltail, black sagebrush, bud sagebrush, and winterfat are potential natural vegetation species occurring on the four soil associations mentioned above.

Piñon-Juniper Vegetation Type

Piñon-juniper woodlands generally occur on steep hillsides and mountains at all aspects, between 6,200 and 8,600 feet amsl. This vegetation type generally occurs on shallow, loamy soils with high percentages of coarse fragments. Singleleaf piñon and Utah juniper dominate the overstory in this type. The understory is often nothing more than barren soil in dense stands of this vegetation type. Piñon-juniper woodlands occur in Mau-Shagnasty-Eightmile (321), Labshaft-Rock outcrop complex, and Ratto soil associations. Shrubs present include mountain big sagebrush, basin big sagebrush, Wyoming big sagebrush, antelope bitterbrush, black sagebrush, and rabbitbrush. Grasses including Sandberg bluegrass, bottlebrush squirreltail, Thurber's needlegrass, Idaho fescue (*Festuca idahoensis*), basin wildrye, and bluebunch wheatgrass are present in the generally sparse understory. These woodlands typically occur along the north south trending mountains above elevations of 6,700 feet amsl and were present in approximately 6,**896.8** acres (**30.1** percent) of the Project Area.

According to the NRCS ecological site description for the Mau-Shagnasty-Eightmile association, the potential natural vegetation for the sites currently vegetated by piñon-juniper woodlands includes Thurber's needlegrass, bluebunch wheatgrass, and big sagebrush. No potential native

vegetation was documented for Ratto and Labshaft-Rock outcrop complex associations. For the Mau-Shagnasty-Eightmile association, the potential natural vegetation has been largely replaced with piñon-juniper woodlands. This encroachment by piñon-juniper woodlands implies a lack of fire in the area. Since the advent of fire suppression, there has been a migration of piñon-juniper habitat into sagebrush steppe communities.

Big Sagebrush/Piñon-Juniper Vegetation Type

The big sagebrush/piñon-juniper vegetation type occurs within and surrounding the Project Area. This vegetation type constitutes up to 13.1 percent (2,996.1 acres) of the vegetation within the Project Area and is located just north of the proposed open pit location and along the bench of the Whistler Range on the Kobeh Valley side. Islands of piñon-juniper woodlands and scattered trees occur throughout the big sagebrush in this vegetation type and indicate an encroachment of piñon-juniper woodlands into the big sagebrush type. This vegetation type comprises the following soil associations: Chad-Cleavage-Softscrabble (681), Mau-Shagnasty-Eightmile, and Labshaft-Rock outcrop complex. The elevation for this vegetation type ranges from 5,500 to 7,500 feet amsl. The big sagebrush/piñon-juniper vegetation type is typically found on hillsides, alluvial fans, and benches. Understory vegetation found within this existing type include bluebunch wheatgrass, Sandberg bluegrass, bottlebrush squirreltail, basin wildrye, Idaho fescue, and Thurber's needlegrass. Shrub and overstory species include big sagebrush, Nevada ephedra (*Ephedra nevadensis*), and serviceberry .

The soil associations found in the area of this vegetation indicates that the potential natural vegetation was historically a grass dominated vegetation type with sagebrush and other shrubs in percentages of no more than 25 percent; however, no data are available for the potential natural vegetation for the Labshaft-Rock outcrop association to compare to the existing vegetation type.

Piñon-Juniper/Big Sagebrush Vegetation Type

The piñon-juniper/big sagebrush vegetation type is commonly found in the north and central portions of the Project Area and makes up approximately 12.7 percent (approximately 2,902.3 acres) of the Project Area. This vegetation type is typically found at elevations between 6,200 and 7,000 feet amsl, and is dominated by piñon-juniper woodlands with many inclusions of big sagebrush located throughout. Existing understory vegetation includes Nevada ephedra, Sandberg bluegrass, bluebunch wheatgrass, bottlebrush squirreltail, Idaho fescue, basin wildrye, cheatgrass, and Indian ricegrass. Overstory species including rabbitbrush and low sagebrush (*Artemisia arbuscula*) are also present but not dominant.

Grasses are a large percentage of the potential natural vegetation occurring within the Labshaft-Rock outcrop complex, Handy (922), Atrypa (830), Shagnasty-Ravenswood-Rock outcrop (764), and Chad-Cleavage-Softscrabble (681) associations where the existing piñon-juniper/black sagebrush vegetation type occurs. The potential natural vegetation for the Atrypa association includes piñon, juniper, and big sagebrush. This potential natural vegetation is similar to the existing vegetation type of all the soil associations present. Soil map unit 681 should have 45 percent grass and 45 percent shrub composition for the potential natural vegetation, whereas the other associations have a grass composition up to 65 percent and no lower than 55 percent. The existing vegetative community (woodland/shrub community) has transitioned to a later seral stage from that of a grass-dominated area. Potential native vegetation understory and overstory species at these sites include bluebunch wheatgrass, Thurber's needlegrass, low sagebrush, black

sagebrush, goldenweed (*Haplopappus acaulis*), big sagebrush, Utah juniper, singleleaf piñon, Indian ricegrass, needle and thread grass (*Hesperostipa comata*), Nevada bluegrass (*Poa nevadensis*), bottlebrush squirreltail, and black greasewood.

Big Sagebrush/Low Sagebrush Vegetation Type

A substantial portion (2,643.2 acres and 11.**5** percent) of the Project Area is vegetated by the big sagebrush/low sagebrush type. This type occurs on the alluvial fans, hillsides, and bottom areas in the northeastern section of the Project Area and extends beyond the Project boundary to the east toward Diamond Valley where the type is bound by Garden Pass Creek. This type occurs at lower to mid-elevations, which range from 5,900 to 6,800 feet amsl. Islands of low sagebrush occur within the big sagebrush community with occasional Utah juniper in the area. Other overstory species found in the existing community include Nevada ephedra and rabbitbrush. Dominant understory vegetation species found in this type include squirreltail and Indian ricegrass. The big sagebrush/low sagebrush type is solely found in the Ratto soil association. The Project Area is located within the NRCS 028BY010NV MLRA. The NRCS rangeland ecological site description for this MLRA identifies Wyoming big sagebrush as the dominant shrub species, with other species of trees and shrubs including Douglas' rabbitbrush, fourwing saltbush (*Atriplex canescens)*, Nevada ephedra, spiny hopsage (*Grayia spinosa)*, and Utah juniper. The NRCS also identifies Indian ricegrass and needle and thread as the dominant grasses in this MLRA, with other grasses including bottlebrush squirreltail, Sandberg's bluegrass, western wheatgrass, and basin wildrye. Forbs include globemallow (*Sphaeralcea* sp.), phlox (*Phlox* sp.), and paintbrush.

Vegetation in this community generally agreed with the potential native vegetation predicted by the NRCS ecological site description for loamy 8-10" P.Z, except for the presence of low sagebrush which was observed during the surveys but not predicted for the ecological site.

Salt Desert Scrub Vegetation Type

The salt desert scrub vegetation type generally occurs in saline areas along drainages, margins of lake beds and marshes, and on flats and basins at elevations between 5,900 and 6,200 feet amsl. Phreatophytic vegetation is typically located in this vegetation type. Black greasewood dominates the south end of Kobeh Valley and comprises approximately 261.4 acres, or 1.1 percent of the Project Area. Associated species in the area include rabbitbrush, halogeton (*Halogeton glomeratus*), spiny hopsage, shadscale saltbush, iodine bush (*Allenrolfea occidentalis*), and saltgrass. Low sagebrush also occurs as inclusions throughout the greasewood community and transitions to low sagebrush communities where there is elevated clay content in soils (Great Basin Ecology 2008).

The list of potential native vegetation included in the NRCS ecological site descriptions associated with this vegetation community and species observed include shadscale and black greasewood.

Agricultural Land

Approximately **70.4** acres of the Project Area is located on private agricultural land along the proposed powerline route. This vegetation type is cultivated, and is therefore altered from natural

conditions, and constitutes approximately 0.1 percent of the Project Area. **Although this vegetation type is located in the loamy (8-10" P.Z.) and silty (8-10" P.Z.), the potential native vegetation is not present as a result of the modified landscape.**

Vegetation Types Located Outside of the Project Area

Additional vegetation communities located outside of the Project Area have the potential to be indirectly impacted by the Project. These communities include agricultural lands that are located outside of the Project Area in the Roberts Creek drainage and phreatophytic vegetation. Phreatophytic vegetation as described in Section 3.2.2.6.5 includes plants that send their roots in to the water table and depend on a constant supply of ground water. The mapped locations of phreatophytic vegetation in the Project Area and vicinity are illustrated on Figures 3.2.20 and 3.9.2.

3.9.2.2.2 Special Status Plant Species

The Project Area contains limited acreage of potentially suitable habitat for Beatley buckwheat. Although several species of buckwheat were identified in the Project Area, including locations on or around the rock outcrops, Beatley buckwheat was not among the species identified. Round headed desert buckwheat (*Eriogonum sphaerocephalum*), umbrella desert buckwheat (*E. umbellatum*), and parsley desert buckwheat (*E. heracleoides*) were the species observed in the Project Area (SRK 2007b).

The claypan soils located on the valley floor and the volcanic ridge located in the eastern portion of the proposed well field in Kobeh Valley were identified as potential habitat for windloving buckwheat. Potential habitat in the Project Area was surveyed and no windloving buckwheat individuals were located.

No occurrences of least phacelia were identified during the survey. Most of the drainages in the Project Area are ephemeral drainages serving as channels for storm water drainage and spring snow melt. The associated species, false hellebore (*Veratrum viride*), mule's ear (*Wyethia amplexicaulis*), and aspen, were also not found in the Project Area. Only five springs were located in the Project Area. Garden Pass Spring, located in the northeast portion of the Project Area, has been developed into a stock pond. The soil was heavily compacted and devoid of vegetation due to **trampling and heavy** use. A second "spring" was located on the east slope of Mount Hope. This "spring" consisted of a pipeline extending from an historic adit. The pipeline transported a portion of the flow to a stock pond that was in similar condition to the Garden Pass Spring stock pond. Neither site provided suitable habitat for least phacelia. Mount Hope Spring was dry, with extensive piñon-juniper and sagebrush dominating the site. No other suitable habitat was observed during the survey (SRK 2007b).

The Monte Neva Indian paintbrush, a Nevada endemic, has not been located within the Project Area; however, the BLM and NNHP have identified this species as occurring at a location that is approximately two miles southwest of the southern extent of the ten-foot drawdown just north of U.S. Highway 50 near Hot Springs Hill between Lone Mountain and 3 Bars Road outside the Project Area boundary. Focused surveys for the Monte Neva Indian paintbrush were not conducted in the Project Area because suitable habitat for this species is not located within the Project Area. This is one of the two known populations of this species in Nevada. The NNHP describes potential habitat for the Monte Neva Indian paintbrush as damp, open, alkaline to

saline clay soils of hummocks and drainages on travertine hot-spring mounds with greasewood, rubber rabbitbrush, and alkali sacaton (http://heritage.nv.gov/atlas/castisalsu.pdf).

3.9.2.2.3 Wildland Fire Prevention and Control

Historically, the approach to fire management has been one of full or modified suppression for all wildland fires on public lands; therefore, very limited use of prescribed fire or fuels management has occurred. The past practice of fire suppression has led to the development of a dense overstory that inhibits the existence of a healthy native herbaceous understory. This practice has also resulted in creating a high level of fire fuel hazards. As a result, there have been numerous and extensive wildland fires in the recent past and greater emphasis has now been placed on wildland fire rehabilitation and hazardous fuels reduction. New national direction is outlined in the Review and Update of the 1995 Federal Wildland Fire Management Update (2001 Federal Fire Policy). In addition, the National Fire Plan (NFP) provides for implementation of hazardous fuel reduction activities such as those outlined in the Healthy Forests Initiative and **HFRA**. Congress has provided funds to address hazardous fuels management issues and to re-introduce fire into fire dependent ecosystems.

BLM fire management activities include the creation of fuel breaks via mechanical thinning, by the BLM, adjacent to key vegetative communities prior to conducting prescribed fire. Activity fuels created by vegetation removal are either piled and burned or chipped. Pile burning disposal involves the burning of piles of specific size and fuel size distribution. BLM fire management activities also include treatment with prescribed fire followed by seeding. A combination of ignition devices are used including helitorches, terra torches, drip torches, fuses, flare guns, and hand thrown ignition devices. The size of burn areas are limited by the existing and planned fuel breaks, time of day and season of ignition, live fuel moisture variations as a result of changes in elevation, and firing patterns.

3.9.2.2.4 Climate Change

Vegetation composition is integral to many **functioning ecosystems**. Potential changes in vegetation associated with projected effects of climate change may alter **plant communities (U.S. Global Research Program 2009)**. Climate change contributes to changes in stream systems, such as flow, temperature, and turbidity. It is predicted that climate change will exacerbate the effects of land management activities to streams and aquatic habitats. Changes in climate can influence the timing and length of seasons, which in turn can have a direct effect on plants and animals. This includes changes in ranges, abundances, phenology (timing of an event such as breeding), morphology and physiology, community composition, biotic interactions and behavior. Changes are being seen in all different types of taxa, from insects to mammals, in North America as well as on many other continents. Climate change is contributing to effects on glacial systems, which are advancing or receding, depending on local conditions.

Climate change predictions include increased duration and frequency of droughts and an increase in extreme precipitation events. This combination can result in an increase of surface soil erosion and gullying beyond current levels. Continental scale shifts in precipitation may lead to areas where there are increases and decreases in soil moisture. Prolonged drought would also affect soil respiration, resulting in a decreased soil **C** pool. Climate change (warmer/drier summer conditions, warmer winters) may be one of the factors in recently observed changes in forest health involving large areas of tree mortality from a variety of insect agents. Many forest

communities are resilient in responding to normal variations in weather and climate to which they are adapted. However, currently occurring increases in forest insect infestations and tree mortality throughout the Planning Area may be partially due to global climate change acting in concert with other variables such as long-term fire suppression, particularly in areas where stands are overstocked. Due to changes in climate, grasslands and rangeland could expand into previously forested areas. Additionally, sagebrush habitats may decline sharply throughout the region and be replaced with grasslands. Increasing CO_2 concentrations also lead to preferential fertilization and growth of specific plant species, such as invaders like cheat grass. Climate change may favor certain shrub species, both native and exotic. Increased CO_2 in the atmosphere may favor growth of most woody plants and "cool-season" grasses at the expense of "warm season grasses." These and other differences among species could lead to changes in the composition of rangeland vegetation, but generalizations are difficult. Climate change affects the water cycle through decreased snow pack, runoff timing, and changes to total runoff volumes. Increased frequency of high intensity rainfall events related to global climate change could result in increased stream sedimentation or alteration of stream channels.

3.9.3 Environmental Consequences and Mitigation Measures

The environmental consequences of the Proposed Action and each alternative as they relate to vegetation resources are discussed in this section.

3.9.3.1 Significance Criteria

Based upon NEPA guidelines and commonly accepted criteria, the Proposed Action or alternatives would normally be considered to have a significant effect on vegetation resources if the following occurred:

- Substantially affect a species or habitat afforded protection under either the ESA or state law, or designated as having special status (e.g., species of concern, sensitive species, etc.) by an overseeing agency;
- Eliminate, reduce, or adversely affect a unique or rare natural plant community within the Project Area;
- Failure of reclamation efforts to achieve a stable, perennial vegetation cover that protects disturbed soil surfaces against erosion; or
- Establish plant communities on the reclaimed areas that fail to meet the reclamation objective for providing suitable forage for livestock, wildlife, and wild horses.

3.9.3.2 Assessment Methodology

Potential effects on vegetation resources can be categorized as direct and indirect, as well as short term (i.e., during the life of the Project) and long term. Direct effects on vegetation resources would include temporary and permanent loss of vegetation associated with construction, operation, and maintenance of the Project. Additional direct effects from the Project could include degradation of vegetation due to trampling, soil compaction, spills, increased access, and introduction of noxious weeds and invasive and nonnative species. Indirect effects could occur as a result of water table decline. Short-term impacts are those that could occur during Project implementation and until reclamation is complete. Long-term impacts are those occurring after reclamation is complete. The effects are determined to be significant or not significant based on the applicable significance criteria listed in Section 3.9.3.1.

3.9.3.3 Proposed Action

3.9.3.3.1 Vegetation Communities Disturbed by the Proposed Action

Implementation of the Proposed Action would result in the temporary disturbance or loss of up to 8,355 acres of vegetation over the 44-year mine life. Table 3.9-4 indicates the types of plant communities that could be impacted within the Project Area boundary. None of the eight vegetation communities located in the Project Area are considered unique with regard to the area's known resources, as they represent some of the most common vegetation types in northern Nevada. Under the Proposed Action, eight plant communities (big sagebrush, piñon-juniper, big sagebrush/ piñon-juniper, piñon-juniper/big sagebrush, big sagebrush/low sagebrush, salt desert scrub, and juniper) would be disturbed. Disturbance acreages are presented in Table 3.9-4.

As indicated in Table 3.9-4, the vegetation community with the largest impact from Project-related surface disturbance would be the big sagebrush community, with 28.8 percent of the total surface disturbance occurring in that community. The disturbance would be associated with the construction of the North TSF, South TSF, the Kobeh Valley Well Field, and the powerline. Approximately 24.5 percent of the surface disturbance would occur in the big sagebrush/piñon-juniper community, and 20.6 percent would occur in the piñon-juniper/big sagebrush vegetation community, 16.3 percent would occur in the piñon-juniper vegetation community, and 9.1 percent would occur in the big sagebrush/low sagebrush vegetation community. Approximately 0.5 percent of disturbance would occur in the salt desert scrub community and 0.02 percent in the agricultural lands.

Table 3.9-4: Areas of Vegetation Communities Disturbed or Removed by Project Components

Vegetation Community Types	Total Project Disturbance[3]	Percent of Total Project Disturbance
Big sagebrush	**1,976**	**23.80**
Piñon-juniper	**1,401**	**16.87**
Big sagebrush/ Piñon-juniper	**2,195**	**26.43**
Piñon-juniper/Big sagebrush	**1,895**	**22.82**
Big sagebrush/ Low sagebrush	**830**	**9.99**
Salt Desert Scrub	**6**	**0.07**
Agricultural	**2**	**0.02**
Undetermined (unspecific exploration activities)[2]	50	-
Total Disturbance Acreage	**8,355**	100.0

[1] Up to 50 acres of exploration surface disturbance may occur under the Proposed Action. **Since the location of exploration areas cannot be determined at this time, the impact of that disturbance has not been calculated.** Site-specific reviews/approvals would be coordinated with the BLM.

The Proposed Action would result in the conversion of tree- and shrub-dominated vegetation types in the Project Area to grass/forb-dominated vegetation types following reclamation. Over the long term, shrubs and trees would become reestablished and increase in abundance within the majority of disturbed areas as a result of reclamation and natural recolonization. Due to timing of Project development and concurrent reclamation, the total acreage of vegetation disturbed would not occur all at one time. Upon completion of the Project, the reclamation portion of the Proposed Action would be completed for 7,621 acres (91 percent of the disturbed area).

Approximately 734 acres of vegetation in the vicinity of the open pit would be removed and not reclaimed.

The removal of 3,**296** acres of singleleaf piñon and Utah juniper trees would be a long-term impact, since it would take approximately 75 to 100 years for mature woodlands to become reestablished in the disturbance areas. Of the 3,**296** acres of total disturbance in piñon-juniper vegetation, approximately 734 acres of piñon-juniper woodland would be permanently lost due to the development of the open pit.

Project-related development would also impact approximately 5,**007** acres of shrub-dominated vegetation types. This loss would represent a long-term impact as it would take up to 15 to 20 years following reclamation for mature shrubs species to reestablish.

Reclamation and revegetation would minimize the aforementioned impacts to vegetation. A total of 7,**621** acres (or **91** percent of the disturbed area) would eventually be revegetated. Only the 734 acres of the open pit would remain unvegetated. Revegetation activities would be conducted as outlined in Section 2.1.17. Reclamation seed mixtures and application rates, based on BLM requirements, are shown in Tables 2.1-9 and 2.1-10. These mixtures would provide forage and cover species similar to the pre-disturbance conditions, facilitating the post-mining land uses of livestock grazing, wild horses, and wildlife habitat. In addition, these seed mixes have been determined based on the species' ability to grow within the constraints of the low annual precipitation experienced in the region, its suitability for site aspect, and the elevation and soil type. The proposed seed mixture and application rates would be subject to modification by the BLM. The actual seed mixture and application rates would be determined prior to seeding based on the results of reclamation in other areas of the mine, concurrent reclamation, revegetation test plots, or changes by the BLM in its seed mix requirements.

- **Impact 3.9.3.3-1:** Disturbance or removal of vegetation community types would occur as a direct result of the Proposed Action.

  Significance of the Impact: The impact would be considered less than significant because the disturbance would not occur all at once and would include concurrent reclamation.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Phreatophytes that may be impacted as a result of the Proposed Action aquifer drawdown occur in Kobeh Valley. In the central Kobeh Valley, as discussed in Section 3.2 the shallow ground water (between zero and ten feet bgs) at the valley floor supports substantial areas of phreatophyte vegetation (Figure 3.9.2). Current conditions include the presence of the following phreatophytic species in the phreatophyte vegetation community: greasewood; rabbitbrush; and saltgrass. ET of ground water by phreatophytes is the primary ground water discharge in the basin. As illustrated on Figure 3.2.9, approximately 4,122 acres of phreatophyte vegetation were mapped as occurring within the area predicted to be impacted by aquifer drawdown. More recent data from satellite imagery indicate that as many 28,500 acres of phreatophytes are located in Kobeh Valley; however, these data are not yet finalized (USGS 2011). In order to verify the extent of phreatophytes potentially impacted by the Project, the soil associations in Kobeh Valley were reviewed to determine

which soils are associated with phreatophytes. This review identified Bubus loam (1010), Bubus-Dianev (1012), Ocala silt loam (161), Dianev silt loam (250), Brinnum silt loam (400), and Beanflat silt loam (410). The extent of these soils in Kobeh Valley is similar to the extent of phreatophytes identified in the preliminary results from the USGS Open-File Report 2011-1089 (USGS 2011), and are distributed southwest of the Project Area and overlap modeled ground water drawdown contours up to 70 feet in depth. However, the majority of phreatophytes that would be impacted are located in the area predicted to experience a ten- to 20-foot drawdown. The resultant depth to ground water would be between ten feet (if the baseline ground water level was at the surface) and up to 30 feet (if the baseline ground water level was ten feet below the surface). On average, the majority of the phreatophytes are predicted to experience an increase in depth to ground water of 20 feet as a result of the Proposed Action. However, based on the more recent phreatophyte location data some of the phreatophytes would be located where the depth to ground water is predicted to increase as much as 70 feet as a result of the Proposed Action.

Where the phreatophytes would be impacted as a result of ground water drawdown, the increase in the depth to ground water is expected to result in impacts to the phreatophyte vegetation through a change in vegetation composition and cover. Lowering of the water table resulting from ground water drawdown is a change in resource availability for the vegetation with an associated increase in ecological stress. Species adapted to conditions of higher available water would be replaced over time by species adapted to conditions of lower available water. Change in the depth to ground water is not the only factor that affects the composition of phreatophyte communities. Other factors that affect changes in phreatophyte communities include the following: amount of annual precipitation; climate change; livestock grazing; and fire regime (McLendon 2011).

In the areas where the phreatophytes would experience an increased depth to water of 20 feet (which is what the majority of phreatophytes would experience), the xeric phreatophytes (rabbitbrush and greasewood) are expected to respond by increasing their root depth as the depth to ground water increases and utilize more surface water when it is available (Naumberg et al. 2005). While the percent cover of greasewood and saltgrass may decrease, the percent cover of rabbitbrush would increase (McLendon 2011; Stringham 2011). In areas where the phreatophytes would experience an increase depth to water of 50 feet, the vegetation community would likely shift from greasewood and rabbitbrush to mainly rabbitbrush, and then as the depth to ground water increases more would likely shift to a community dominated by Wyoming big sagebrush (populations of Wyoming big sagebrush are located adjacent to the xeric phreatophytes in Kobeh Valley). A water table decline could result in perennially drier soils. The deeper water table would preclude salt accumulation at the soil surface, allowing precipitation to leach salts to deeper soil depths, resulting in drier, less saline soils, and creating conditions where xeric phreatophytes can survive (Cooper et al. 2006). Additionally, recovery of the water table following Project-related ground water pumping could result in a transition back to a pre-Project vegetation community state (Stringham 2011).

Impacts to other vegetation communities as a result of drawdown are not expected. The predicted ten-foot water drawdown contour for the Proposed Action does not intercept any known phreatophyte vegetation within Diamond Valley, Antelope Valley, or Pine Valley.

- **Impact 3.9.3.3-2: Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.**

  Significance of the Impact: The impact is **not** considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The Project mining activities and vehicular traffic would affect vegetation within the immediate vicinity of the Project Area by increasing the amount of airborne particulate deposition onto vegetation surfaces. Deposition could result in lowered primary production in plants due to reduced photosynthesis and decreased water-use efficiency. The potential effects on vegetation from dust would be reduced by wind and periodic precipitation, which would remove some of the accumulated dust. In addition, the implementation of the fugitive dust reduction measures outlined in the Proposed Action would reduce the impact of dust deposition on vegetation.

- **Impact 3.9.3.3-3:** Vegetation in the immediate vicinity of the Project Area could suffer periodic short-term reductions in primary production due to airborne particulate deposition onto exposed surfaces.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The fenced area around the Project would limit BLM fire management activities by preventing normal access. The development of the Project well field in Kobeh Valley would create multiple unvegetated linear features (roads) that could be used as fire breaks in BLM fire management activities. These constructed roads could also provide additional access for potential fire management activities. Mine equipment and water resources could also be used to aid in suppression activities.

Potential impacts to the management of vegetation communities for wildland fire prevention and control as a result of Project activities would be limited as a result of the implementation of precautionary measures outlined in Sections 2.1.10 and 2.1.14.8.

- **Impact 3.9.3.3-4:** The Project would result in limitations and enhancements to the BLM's fire management activities within the vicinity of the Project Area.

  Significance of the Impact: Based on the conclusions from the analysis, the impact is not significant. The following mitigation is proposed **for this impact**.

- **Mitigation Measure 3.9.3.3-4:** During periods of high fire danger, EML would utilize welding tents during welding activities along the pipeline or powerline routes in the Project Area.

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.9.3.3-4 would be effective at reducing the potential for Project activities to result in wildland fires.

3.9.3.3.2 Special Status Plant Species

Based on habitat requirements or known distribution, three special status plant species were identified as potentially occurring in the Project Area. As discussed above, field surveys were conducted in the Project Area for Beatley buckwheat, windloving buckwheat, and least phacelia. No habitat was observed for least phacelia and no populations of least phacelia were observed in the Project Area. Limited potentially suitable habitat was identified for Beatley buckwheat and windloving buckwheat; however, no populations of Beatley buckwheat or windloving buckwheat were observed in the Project Area.

- **Impact 3.9.3.3-5:** Disturbance or removal of potential habitat for Beatley buckwheat and windloving buckwheat could occur as a result of the Proposed Action.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Habitat for Beatley buckwheat, windloving buckwheat, and least phacelia is located outside of the Project Area within the area that is predicted to be impacted by the aquifer drawdown. Potential habitat for Beatley buckwheat includes dry volcanic outcrops and potential habitat for windloving buckwheat includes claypan soils located on the valley floor and volcanic ridges. While there is potential habitat for these two species of buckwheat located within the area predicted to be impacted by the aquifer drawdown, these species are not wetland-dependent. Therefore, no indirect impacts to these species are anticipated as a result of the aquifer drawdown.

Potential habitat for least phacelia includes vernally saturated, summer-drying, sparsely vegetated, partially shaded to fully exposed areas of bare soil and mud banks in meadows. Potential habitat for this species is located within the area predicted to be impacted by the aquifer drawdown. However, additional habitat for this species is located outside of the area predicted to be indirectly impacted by the Proposed Action and as of 2001 this species had been located 39 times in the State of Nevada (http://heritage.nv.gov/atlas/phaceminut.pdf).

- **Impact 3.9.3.3-6:** Potential, unsurveyed habitat for least phacelia located outside of the Project Area would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the potential habitat could potentially impact these species indirectly.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Although there are no known occurrences of Monte Neva Indian paintbrush in the Project Area; the BLM has identified occupied habitat for this species between Lone Mountain and 3 Bars Road near Hot Springs Hill. The species is aquatic or wetland-dependent but lies outside of the area impacted by the predicted aquifer drawdown.

- **Impact 3.9.3.3-7:** Occupied and potential habitat for the Monte Neva Indian paintbrush is not expected to experience water stress because it is located outside of the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. However, lowering of the water table in the occupied and potential habitat could potentially impact this species.

  Significance of the Impact: No indirect impact from the Proposed Action is expected to this species or occupied habitat because they are located outside of the predicted water table drawdown. Yearly monitoring would be conducted for this species. If impacts to the species from the Project are detected mitigation would be developed by the BLM and EML.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.9.3.3.3 Residual Adverse Impacts

Residual adverse impacts to vegetation would include the permanent loss of vegetative productivity from approximately 734 acres of land associated with the open pit that would not be reclaimed and a long-term change in vegetation composition (i.e., tree and shrub dominated communities to grass and forb dominated communities, potential **change in** phreatophyte vegetation **percent cover and composition**) as a result of Project development and operation.

Residual adverse effects to special status species would not occur as a result of the Project since no special status species were located within the Project Area. There is a potential residual indirect effect to potential unoccupied special status plant species habitat.

3.9.3.4 No Action Alternative

Under the No Action Alternative, the proposed Project would not be developed and associated impacts to vegetation would not occur. EML would continue existing activities under previously permitted Notices, and the area would remain available for future mineral development or for other purposes as approved by the BLM.

3.9.3.4.1 Vegetation Communities Disturbed by the No Action Alternative

Under the No Action Alternative, EML would continue to conduct mineral exploration and data acquisition within the Project Area. Ongoing reclamation would help to minimize impacts to vegetation through continuation of current and ongoing activities, with resulting short-term impacts to herbaceous species and long-term impacts to woody species.

- **Impact 3.9.3.4-1:** Implementation of the No Action Alternative would result in the general removal of vegetation.

Significance of the Impact: The impact is not considered significant.

3.9.3.4.2 Special Status Plant Species

No additional disturbance beyond that previously authorized would occur in association with ongoing existing operations. As a result, there would be no additional impacts to potential habitat for special status plant species under this alternative.

3.9.3.4.3 Residual Adverse Impacts

The No Action Alternative would have unavoidable short-term impacts to herbaceous species and long-term impacts to wood vegetation species as part of surface disturbance associated with permitted exploration and data acquisition; however, revegetation and reclamation would minimize these impacts to vegetation.

3.9.3.5 Partial Backfill Alternative

3.9.3.5.1 Vegetation Communities Disturbed by the Partial Backfill Alternative

Impacts to vegetation community types would be similar to those described for the Proposed Action; however, the Partial Backfill Alternative would involve the partial backfilling of the open pit to eliminate the pit lake and the floor of the open pit would be reclaimed using growth media and then seeded. Although the Proposed Action would have 734 acres that would remain unvegetated in the open pit, under this alternative approximately 527 acres would remain unvegetated following Project completion and reclamation; therefore, impacts to vegetation would be similar to, but slightly less than, those described for the Proposed Action.

- **Impact 3.9.3.5-1:** Disturbance or removal of vegetation community types would occur as a result of the Partial Backfill Alternative.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Impacts to phreatophyte vegetation would be similar to those under the Proposed Action.

- **Impact 3.9.3.5-2: Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.**

  Significance of the Impact: The impact is **not** considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The Project mining activities and vehicular traffic would affect vegetation within the immediate vicinity of the Project Area by increasing the amount of airborne particulate deposition onto vegetation surfaces. Deposition could result in lowered primary production in plants due to reduced photosynthesis and decreased water use efficiency. The potential effects on vegetation from dust would be reduced by wind and periodic precipitation, which would remove some of the accumulated dust. In addition, the implementation of the fugitive dust reduction measures outlined in the Proposed Action would reduce the impact of dust deposition on vegetation.

- **Impact 3.9.3.5-3:** Vegetation in the immediate vicinity of the Project Area could suffer periodic short-term reductions in primary production due to airborne particulate deposition onto exposed surfaces.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The fenced area around the Project would limit BLM fire management activities by preventing normal access. The development of the Project well field in Kobeh Valley would create multiple unvegetated linear features (roads) that could be used as fire breaks in BLM fire management activities. These constructed roads could also provide additional access for potential fire management activities. Mine equipment and water resources could also be used to aid in suppression activities.

Potential impacts to the management of vegetation communities for wildland fire prevention and control as a result of Project activities would be limited as a result of the implementation of precautionary measures outlined in Sections 2.1.10 and 2.1.14.8.

- **Impact 3.9.3.5-4:** The Project would result in limitations and enhancements to the BLM's fire management activities within the vicinity of the Project Area.

  Significance of the Impact: Based on the conclusions from the analysis, the impact is not significant. The following mitigation measure is proposed **for this impact**.

- **Mitigation Measure 3.9.3.5-4:** During periods of high fire danger, EML would utilize welding tents during welding activities along the pipeline or powerline routes in the Project Area.

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.9.3.5-4 would be effective at reducing the potential for Project activities to result in wildland fires.

3.9.3.5.2 Special Status Plant Species

Impacts to special status plant species and their habitat as a result of the Partial Backfill Alternative would be similar to those for the Proposed Action.

- **Impact 3.9.3.5-5:** Disturbance or removal of potential habitat for Beatley buckwheat and windloving buckwheat could occur as a result of the Proposed Action.

  Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.5-6:** Potential, unsurveyed habitat for least phacelia located outside of the Project Area would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the potential habitat could potentially impact these species indirectly.

  Significance of the Impact: The indirect impact of the Proposed Action to potential habitat of these species would not meet the significance criteria listed in Section 3.9.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.5-7:** Occupied and potential habitat for the Monte Neva Indian paintbrush is not expected to experience water stress because it is located outside of the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. However, lowering of the water table in the occupied and potential habitat could potentially impact this species.

  Significance of the Impact: No indirect impact from the Proposed Action is expected to this species or occupied habitat because they are located outside of the predicted water table drawdown. Yearly monitoring would be conducted for this species. If impacts to the species from the Project are detected, mitigation would be developed by the BLM and EML.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.9.3.5.3 Residual Adverse Impacts

Residual adverse effects to vegetation would include the permanent loss of vegetative productivity from approximately 527 acres of land associated with the open pit that would not be reclaimed and a long-term change in vegetation composition (i.e., tree and shrub dominated communities to grass and forb dominated communities, potential **change in** phreatophyte vegetation **percent cover and composition**) as a result of Project development and operation.

Residual adverse effects to special status species would not occur as a result of the Project since no special status species were located within the Project Area.

3.9.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

3.9.3.6.1 Vegetation Communities Disturbed by the Off-Site Transfer of Ore Concentrate for Processing Alternative

Although the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in approximately 20 acres less surface disturbance in the piñon-juniper/big sagebrush vegetation community when compared to the Proposed Action, impacts to vegetation community types from this alternative would be similar to those for the Proposed Action since the disturbance acreage would decrease by only 0.2 percent.

- **Impact 3.9.3.6-1:** Implementation of the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the general removal of vegetation.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Impacts to phreatophyte vegetation would be similar to those under the Proposed Action.

- **Impact 3.9.3.6-2: Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.**

  Significance of the Impact: The impact is **not** considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The Project mining activities and vehicular traffic would affect vegetation within the immediate vicinity of the Project Area by increasing the amount of airborne particulate deposition onto vegetation surfaces. Deposition could result in lowered primary production in plants due to reduced photosynthesis and decreased water use efficiency. The potential effects on vegetation from dust would be reduced by wind and periodic precipitation, which would remove some of the accumulated dust. In addition, the implementation of the fugitive dust reduction measures outlined in the Proposed Action would reduce the impact of dust deposition on vegetation.

- **Impact 3.9.3.6-3:** Vegetation in the immediate vicinity of the Project Area could suffer periodic short-term reductions in primary production due to airborne particulate deposition onto exposed surfaces.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The fenced area around the Project would limit BLM fire management activities by preventing normal access. The development of the Project well field in Kobeh Valley would create multiple unvegetated linear features (roads) that could be used as fire breaks in BLM fire management activities. These constructed roads could also provide additional access for potential fire management activities. Mine equipment and water resources could also be used to aid in suppression activities.

Potential impacts to the management of vegetation communities for wildland fire prevention and control as a result of Project activities would be limited as a result of the implementation of precautionary measures outlined in Sections 2.1.10 and 2.1.14.8.

- **Impact 3.9.3.6-4:** The Project would result in limitations and enhancements to the BLM's fire management activities within the vicinity of the Project Area.

  Significance of the Impact: Based on the conclusions from the analysis, the impact is not significant. The following mitigation measure is proposed **for this impact**.

- **Mitigation Measure 3.9.3.6-4:** During periods of high fire danger, EML would utilize welding tents during welding activities along the pipeline or powerline routes in the Project Area.

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.9.3.6-4 would be effective at reducing the potential for Project activities to result in wildland fires.

3.9.3.6.2 Special Status Plant Species

Impacts to special status plant species and their habitat as a result of the Off-Site Transfer of Ore Concentrate for Processing Alternative would be similar to those for the Proposed Action.

- **Impact 3.9.3.6-5:** Disturbance or removal of potential habitat for Beatley buckwheat and windloving buckwheat could occur as a result of the Off-Site Transfer of Ore Concentrate for Processing Alternative.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.6-6:** Potential, unsurveyed habitat for least phacelia located outside of the Project Area would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the potential habitat could potentially impact these species indirectly.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.6-7:** Occupied and potential habitat for the Monte Neva Indian paintbrush is not expected to experience water stress because it is located outside of the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. However, lowering of the water table in the occupied and potential habitat could potentially impact this species.

  Significance of the Impact: No indirect impact from the Off-Site Transfer of Ore Concentrate for Processing Alternative is expected to this species or occupied habitat because they are located outside of the predicted water table drawdown. Yearly monitoring would be conducted for this species. If impacts to the species from the Project are detected mitigation would be developed by the BLM and EML.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.9.3.6.3 Residual Adverse Impacts

The potential residual impacts to vegetation resources from the Off-Site Transfer of Ore Concentrate for Processing Alternative would be similar to those for the Proposed Action.

3.9.3.7 Slower, Longer Project Alternative

Impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action. As discussed in Section 3.2.3, the surface area predicted to be impacted by the drawdown by this alternative is similar to, but slightly different than, the Proposed Action. The differences between the predicted drawdown area is illustrated on Figure 3.2.3. Impacts to vegetation as a result of the Slower, Longer Project Alternative are expected to be similar to the Proposed Action at the end of the Project.

3.9.3.7.1 Vegetation Communities Disturbed by the Slower, Longer Project Alternative

Vegetation communities impacted by the Slower, Longer Project Alternative would be the same as the Proposed Action.

- **Impact 3.9.3.7-1:** Disturbance or removal of vegetation community types would occur as a result of the Slower, Longer Project Alternative.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.7-2: Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.**

  Significance of the Impact: The impact is **not** considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.7-3:** Vegetation in the immediate vicinity of the Project Area could suffer periodic short-term reductions in primary production due to airborne particulate deposition onto exposed surfaces.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The fenced area around the Project would limit BLM fire management activities by preventing normal access. The development of the Project well field in Kobeh Valley would create multiple unvegetated linear features (roads) that could be used as fire breaks in BLM fire management activities. These constructed roads could also provide additional access for potential fire management activities. Mine equipment and water resources could also be used to aid in suppression activities.

Potential impacts to the management of vegetation communities for wildland fire prevention and control as a result of Project activities would be limited as a result of the implementation of precautionary measures outlined in Sections 2.1.10 and 2.1.14.8.

- **Impact 3.9.3.7-4:** The Project would result in limitations and enhancements to the BLM's fire management activities within the vicinity of the Project Area.

  Significance of the Impact: Based on the conclusions from the analysis, the impact is not significant. The following mitigation measure is proposed **for this impact**.

- **Mitigation Measure 3.9.3.7-4:** During periods of high fire danger, EML would utilize welding tents during welding activities along the pipeline or powerline routes in the Project Area.

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.9.3.7-4 would be effective at reducing the potential for Project activities to result in wildland fires.

3.9.3.7.2 Special Status Plant Species

Impacts to special status plant species from the Slower, Longer Project Alternative would be the same as the Proposed Action.

- **Impact 3.9.3.7-5:** Disturbance or removal of potential habitat for Beatley buckwheat and windloving buckwheat could occur as a result of the Slower, Longer Project Alternative.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.7-6:** Potential, unsurveyed habitat for least phacelia located outside of the Project Area would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the potential habitat could potentially impact these species indirectly.

  Significance of the Impact: The indirect impact of the Proposed Action to potential habitat of these species would not meet the significance criteria listed in Section 3.9.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.7-7:** Occupied and potential habitat for the Monte Neva Indian paintbrush is not expected to experience water stress because it is located outside of the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. However, lowering of the water table in the occupied and potential habitat could potentially impact this species.

  Significance of the Impact: No indirect impact of the Proposed Action is expected to this species or occupied habitat because they are located outside of the predicted water table drawdown. Yearly monitoring would be conducted for this species. If impacts to the species from the Project are detected, mitigation would be developed by the BLM and EML.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.9.3.7.3 Residual Adverse Impacts

Residual adverse impacts to vegetation would include the permanent loss of vegetative productivity from approximately 734 acres of land associated with the open pit that would not be reclaimed and a long-term change in vegetation composition (i.e., tree and shrub dominated communities to grass and forb dominated communities, potential **change in** phreatophyte vegetation **percent cover and composition**) as a result of Project development and operation.

Residual adverse effects to special status species would not occur as a result of the Project since no special status species were located within the Project Area.

3.10 Noxious Weeds, Invasive & Nonnative Species

3.10.1 Regulatory Framework

Noxious weeds are designated by state, federal, or other laws and regulations and are mandated to be prevented or controlled because of their potential to cause economic harm (e.g., affect the quality of forage on rangelands, affect cropland, or forest land productivity), environmental harm (e.g., displace native plants and natural habitats), or harm human and animal health. There are no State of Nevada listed noxious weeds found within the boundary of the Project Area. This analysis will focus on invasive plant and nonnative species. Invasive and/or nonnative plant species are generally plants that have become too extensive and widely distributed to be effectively controlled or eradicated.

3.10.1.1 Executive Order 11312: Prevention and Control of Invasive Species

Several federal laws provide direction for addressing the prevention and control of noxious weeds, invasive and nonnative species. For example, the Plant Protection Act authorizes the USDA to list weeds that have been determined to cause certain harm, including damage to agricultural or natural resources, as being "noxious weeds." EO 11312 established a national Invasive Species Council, made up of federal agencies and departments, and a supporting Invasive Species Advisory Council, composed of state, local, and private entities. The Invasive Species Council and Advisory Committee oversees and facilitates implementation of the EO, including preparation of a National Invasive Species Management Plan.

3.10.1.2 Federal Noxious and Invasive Weed Laws

A number of federal laws pertain to noxious and invasive weeds, including the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 U.S.C. 4701 et seq.), Lacey Act, as amended (18 U.S.C. 42), Federal Plant Pest Act (7 U.S.C. 150aa et seq.), Federal Noxious Weed Act of 1974, as amended by the Food, Agriculture, Conservation, and Trade Act of 1990 (Section 1453 "Management of Undesirable Plants on Federal Lands" U.S.C. 2801 et seq.), the Carlson-Foley Act of 1968 (Public Law 90-583), and Federal EO 11312 released February 3, 1999. In Nevada, the BLM is primarily concerned with the control of State of Nevada listed noxious weed infestations and their dispersal on public lands. The BLM, USDA and the Nevada Department of Agriculture (NDOA) maintain lists of noxious weeds of economic or ecological concern.

3.10.1.3 Nevada Noxious Weed Laws

Chapter 555 of the NRS pertains to noxious weeds. The NDOA has responsibility for jurisdiction, management, and enforcement of the state's noxious weed law. Plants on Nevada's noxious weeds list are mandated to be controlled on both private and public land. The NDOA also maintains and updates a list of state listed noxious weeds, which can be found at the following web link, (http://agri.nv.gov/nwac/PLANT_NoxWeedList.htm). Chapter 555 also calls for the establishment of county "Weed Control Districts" with the responsibility to control and eradicate noxious weeds. The legislature declared that it is the responsibility of each owner or occupier of land in Nevada to control noxious weeds on their land, but finds that in certain areas this responsibility can best be discharged through control by organized Weed Districts. **In Eureka County, weed control is primarily discharged through Eureka County weed control under the County Department of Natural Resources and through the Diamond Valley Weed Control District.**

3.10.2 Affected Environment

3.10.2.1 Study Methods

Noxious weed, invasive and nonnative weed surveys were conducted by SRK in a majority of the Project Area between June 2005 through August 2006. The noxious weed, invasive and nonnative species surveys were conducted concurrently with the vegetation and wildlife biological baseline surveys (SRK 2007b, 2007c). The Kobeh Valley portion of the Project Area was surveyed for noxious weeds, invasive and nonnative species by Great Basin Ecology in July 2008 (Great Basin Ecology 2008).

3.10.2.2 Existing Conditions

No infestations of NDOA listed noxious weeds were observed in the Project Area. Cheatgrass (an invasive nonnative annual grass species) was observed as an understory component of most of the vegetation types; however, no large cheatgrass monocultures were observed (SRK 2007b).Other invasive nonnative plants species observed within the Project Area were halogeton and Russian thistle (*Salsola kali*). These two species are not considered noxious weeds by the State of Nevada and, therefore, not listed on the NDOA's noxious weed list.

Although no noxious weeds were observed in the Project Area during the initial 2007 survey, weedy annual species including cheatgrass and halogeton were identified within the Project Area, weedy annual species including cheatgrass and halogeton were identified within the Project Area, and Russian thistle was located near the Project Area. Although Scotch thistle (*Onopordum acanthium*), hoary cress (*Cardaria draba*), and salt cedar (*Tamarix ramosissima*) have been mapped and treated by Eureka County in the vicinity, these species were not observed during initial surveys of the Project Area. Subsequently, hoary cress has been observed along roadsides within the Project boundary.

3.10.3 Environmental Consequences and Mitigation Measures

3.10.3.1 Significance Criteria

Based upon BLM Manual 9015 guidelines, the Proposed Action or alternatives would be considered to have a significant effect on noxious weed management if it resulted in the following:

- An increased likelihood of the introduction of noxious weed species or invasive, nonnative species, into a relatively weed-free area at moderate or high ecological risk as a result of a lack of preventative action; or
- An expansion of noxious weed infestation(s) within and outside of the Project Area into relatively weed-free areas at moderate or high ecological risk.

Ecological risk is the level of likelihood and consequence of adverse effects on the environment. A determination of a Risk Rating (none, low, moderate, or high) is made through the Risk Assessment process outlined in Appendix 1 of BLM Manual 9015. Areas with a moderate or high risk rating have the following: a) noxious weed infestations immediately adjacent to or within the Project Area; b) activities associated with the Project that are likely to result in some areas becoming infested; and c) there are probable adverse effects on native plant communities within, and possibly outside of, the Project Area.

3.10.3.2 Assessment Methodology

The assessment of the effects of the Project on noxious weed management is based on a qualitative analysis of the potential for noxious weeds, invasive and nonnative species to become introduced or established within the Project Area as a result of increased activity disturbance and reclamation. The effects of the Project are determined to be significant or not significant based on the applicable significance criteria listed in Section 3.10.3.1.

3.10.3.3 Proposed Action

Invasive, nonnative plant species readily invade areas that have been disturbed and which typically lack or have minimal vegetation cover. Development and operation of the Project would remove or disturb 8,3**55** acres of vegetation over the 44-year mine life, of which 734 acres associated with the open pit would not be reclaimed.

The **applicant committed practices** outlined in Section 2.1.14.**8** would substantially reduce the introduction and spread of noxious weeds, invasive and nonnative species. The **applicant committed practices** include the implementation of a noxious weed monitoring and control plan

during construction and throughout operations. Implementation of this plan would be coordinated with the BLM, **Eureka County Natural Resource Department, and Diamond Valley Weed Control District.**

Reclamation would also reduce the establishment of noxious weeds in the Project Area. Due to concurrent reclamation, the total acreage of vegetation disturbed would not occur all at one time; however, minor populations of weedy annual species (e.g., halogeton and cheatgrass) may become established in localized areas for short periods of time. Growth media stockpiles would be reclaimed with an interim seed mix to stabilize the growth media, reduce soil erosion, and minimize the potential for the establishment of noxious weeds. Successful reclamation of mine related surface disturbance areas would result in the establishment of a permanent vegetative cover, which would minimize the potential establishment of noxious weeds in the long term. Although the open pit would not be reclaimed, noxious weeds would not likely become established in the open pit due to the absence of soil and the formation of a pit lake in the long term. As described in Section 2.1.14, EML would utilize certified weed-free seed mixes for reclamation. Weed control practices would be implemented in coordination with the BLM to limit the spread of noxious weeds, if they appear in the Project Area.

- **Impact 3.10.3.3-1:** Implementation of the Proposed Action could result in the introduction and spread of noxious weeds, invasive and nonnative species.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.10.3.3-2:** Phreatophyte vegetation, riparian corridors, and wet meadows would potentially experience **changes in species composition and density due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Noxious weeds as well as invasive and nonnative species associated with existing surface disturbance or those transported into the phreatophytes, riparian corridors, and wet meadows could potentially invade areas that experience changes in species composition and density**.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.10.3.3.1 Residual Adverse Impacts

The Proposed Action would result in the unavoidable disturbance of approximately 8,355 acres of vegetation over the 44-year mine life, which would produce conditions conducive to supporting noxious weeds. Implementation of reclamation and the noxious weed monitoring and control plan would reduce or eliminate the chance of noxious weed establishment and infestation **(EML 2006, Appendix 13)**.

3.10.3.4 No Action Alternative

Under the No Action Alternative, the proposed Project would not be developed and associated impacts to noxious weed management would not occur. EML would continue existing activities under previously permitted Notices for a total of 35 acres of surface disturbance and the area would remain available for future mineral development or for other purposes as approved by the BLM.

3.10.3.4.1 Residual Adverse Impacts

There are no residual adverse impacts from noxious weeds associated with the No Action Alternative.

3.10.3.5 Partial Backfill Alternative

Impacts from noxious weeds would be similar to those described for the Proposed Action; however, the Partial Backfill Alternative would involve the partial backfilling of the open pit to eliminate the pit lake and the floor of the backfilled open pit would be reclaimed with growth media and seeded. The **applicant committed practices** outlined in Section 2.1.**14.8** and reclamation would reduce the potential for noxious weeds to establish in the Project Area. Although the Proposed Action would have 734 acres that would remain unvegetated in the open pit, under this alternative approximately 527 acres would remain unvegetated following Project completion and reclamation. Therefore, impacts from noxious weeds would be similar to, but slightly less than, those described for the Proposed Action.

- **Impact 3.10.3.5-1:** Implementation of the Partial Backfill Alternative could result in the introduction and spread of noxious weeds, invasive and nonnative plant species.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.10.3.5-2:** Phreatophyte vegetation, riparian corridors, and wet meadows would potentially experience **changes in species composition and density due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Noxious weeds as well as invasive and nonnative species associated with existing surface disturbance or those transported into the phreatophytes, riparian corridors, and wet meadows could potentially invade areas that experience changes in species composition and density**.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.10.3.5.1 Residual Adverse Impacts

The Partial Backfill Alternative would result in the unavoidable disturbance of approximately 8,**355** acres of vegetation over the 44-year life of the mine, which would produce conditions conducive to supporting noxious weeds. Implementation of reclamation and the noxious weed monitoring and control plan would reduce or eliminate the chance of noxious weed establishment and infestation.

3.10.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Impacts from noxious weeds would be similar to those described for the Proposed Action; however, the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in approximately 20 acres less surface disturbance. The **applicant committed practices** outlined in Section 2.1.14.**8** and reclamation would reduce the potential for noxious weeds to establish in the Project Area. When compared to the Proposed Action, impacts from noxious weeds as a result of this alternative would be similar to those for the Proposed Action since the acreage of surface disturbance would decrease by only 0.2 percent.

- **Impact 3.10.3.6-1:** Implementation of the Off-Site Transfer of Ore Concentrate for Processing Alternative could result in the introduction and spread of noxious weeds, invasive and nonnative plant species.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.10.3.6-2:** Phreatophyte vegetation, riparian corridors, and wet meadows would potentially experience **changes in species composition and density due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Noxious weeds as well as invasive and nonnative species associated with existing surface disturbance or those transported into the phreatophytes, riparian corridors, and wet meadows could potentially invade areas that experience changes in species composition and density.**

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.10.3.6.1 Residual Adverse Impacts

The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the unavoidable disturbance of approximately **8,335** acres of vegetation over the 44-year mine life of which 734 acres associated with the open pit would not be reclaimed, which would produce conditions conducive to supporting noxious weeds. Reclamation and the noxious weed monitoring and control plan would reduce or eliminate the chance of noxious weed establishment and infestation.

3.10.3.7 Slower, Longer Project Alternative

Impacts from noxious weeds would be similar to those described for the Proposed Action; however, the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action and the surface area predicted to be impacted by the drawdown by this alternative is slightly different than the Proposed Action. The differences between the predicted drawdown area is illustrated on Figure 3.2.28. The **applicant committed practices** outlined in Section 2.1.15 and reclamation would reduce the potential for noxious weeds to establish in the Project Area. Impacts from noxious weeds and invasive, nonnative species as a result of the Slower, Longer Project Alternative are expected to be similar to the Proposed Action at the end of the Project.

- **Impact 3.10.3.7-1:** Implementation of the Slower, Longer Project Alternative could result in the introduction and spread of noxious weeds, invasive and nonnative plant species.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.10.3.7-2:** Phreatophyte vegetation, riparian corridors, and wet meadows would potentially experience **changes in species composition and density due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Noxious weeds as well as invasive and nonnative species associated with existing surface disturbance or those transported into the phreatophytes, riparian corridors, and wet meadows could potentially invade areas that experience changes in species composition and density.**

  Significance of the Impact: The impact is **not considered significant.**

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.10.3.7.1 Residual Adverse Impacts

The Slower, Longer Project Alternative would result in the unavoidable disturbance of approximately 8,355 acres of vegetation over the extended mine life, which would produce conditions conducive to supporting noxious weeds. Implementation of reclamation and the noxious weed monitoring and control plan would reduce or eliminate the chance of noxious weed establishment and infestation.

3.11 Wetlands and Riparian Zones

3.11.1 Regulatory Framework

This section discusses the regulatory definition of wetlands, as well as the laws and regulations that may apply to wetland and riparian resources potentially affected by the Project. Wetland communities are considered valuable natural resources that provide habitat for a variety of

dependent plant and wildlife species. Riparian/wetland areas also provide ecosystem services and values that are critical within BLM's multiple use mandate. The USACE and the EPA have policies and laws that regulate federally jurisdictional wetlands. However, there are no federally jurisdictional wetlands within the Project Area. As a result, federal management of wetlands is through the BLM on public lands and through State of Nevada Water Law relative to the use of water from wetlands. State of Nevada Water Law is discussed in Section 3.2.

3.11.1.1 Definition of Wetlands

Wetlands are defined by the USACE and EPA in 40 CFR 230.3 and 33 CFR 328.3 as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal conditions, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

The BLM defines riparian as: "A riparian area is an area of land directly influenced by permanent water. It has visible vegetation or physical characteristics reflective of permanent water influence. Lake shores and stream banks are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil."

In 1991 the BLM Director approved the *Riparian-Wetland Initiative for the 1990's*, which establishes national goals and objectives for managing riparian-wetland resources on public lands. One of the chief goals of this initiative is to restore and maintain riparian-wetland areas so that 75 percent or more are in proper functioning condition (PFC) by 1997 (BLM 1991). The overall objective of this goal is to achieve an advanced ecological status, except where resource management objectives, including PFC, would require an earlier successional stage, thus providing the widest variety of vegetation and habitat diversity for wildlife, fish, and watershed protection. This objective is important to remember because riparian-wetland areas would function properly long before they achieve an advanced ecological status. The *Riparian-Wetland Initiative for the 1990's* also includes a strategy to focus management on the entire watershed. Entire watershed condition is an important component in assessing whether a riparian-wetland area is functioning properly.

The USACE's Wetland Delineation Manual (USACE 1987) defines a three parameter approach to delineating jurisdictional wetlands. In order for an area to be considered a jurisdictional wetland it must support each of the three parameters: hydric soils; wetland vegetation; and wetland hydrology.

3.11.1.2 Executive Order 11990: Protection of Wetlands

The federal government supports a policy of minimizing "the destruction, loss, or degradation of wetlands" (EO 11990, May 24, 1977). The EO directs all federal agencies to refrain from assisting or giving financial support to projects that encroach on public or privately owned wetlands.

3.11.1.3 Federal Land Policy and Management Act

The FLPMA directs the BLM to manage public lands in a manner that would provide for multiple use and at the same time protect natural resources for generations to come. In addition to FLPMA, numerous laws, regulations, policies, EOs, and Memoranda of Understanding (MOUs) direct the BLM to manage its riparian/wetland areas for the benefit of the nation and the economy. BLM Manual 1737 for Riparian Wetland Area Management identifies marshes, shallow swamps, lakeshores, bogs, muskegs, wet meadows, estuaries, and riparian areas as wetlands.

3.11.2 Affected Environment

3.11.2.1 Study Methods

On September 21, 2005, SRK conducted a Routine On-Site Wetland Delineation (SRK 2007e) to determine the presence or absence of jurisdictional and non-jurisdictional wetlands within the Project Area in accordance with the following: Section 404 of the CWA; the USACE Wetland Delineation Manual (USACE 1987); and the Sacramento District, Reno, Nevada, field office Minimum Standards for Acceptance of Preliminary Wetland Delineations (October 11, 1994), revised November 30, 2001. If present, the extent of the wetland was determined. Potential wetlands within the Project Area are supported by spring or seep flow, and ephemeral surface flows. On July 15 through 17, 2011, JBR Environmental Consultants, Inc. (JBR) conducted a supplemental spring and riparian area investigation (JBR 2011).

Prior to the Routine On-Site Wetland Delineation, aerial photographs and topographic map tools were reviewed for indications of open water, springs, and ephemeral, intermittent, and perennial drainages. The Soil Survey of Eureka and Part of White Pine Counties, prepared by the NRCS was reviewed prior to visiting the site (NRCS 1998).

3.11.2.2 Existing Conditions

In the Routine On-Site Wetland Delineation it was determined that no waters of the U.S. are located in the Project Area. With no jurisdictional waters present in the Project Area, USACE jurisdiction does not extend to the wetlands in the Project Area. A number of non-jurisdictional wetlands, or riparian areas, were identified in and surrounding the Project Area. Wetlands identified in the Project Area were recognized by the presence of facultative wet/obligate wetland plant species, ordinary high water mark (OHWM) indicators, and hydric soil indicators. The delineation identified 1,400 square feet (0.03 acre) of wetlands associated with Garden Spring (597) outside of the Project Area. During the July 2011 spring and seep survey, 0.22 acre of riparian vegetation was located within the Project Area associated with the Zinc adit (839) (JBR 2011). The springs and associated riparian vegetation identified in the Project Area and vicinity are shown on Figure 3.9.1.

3.11.3 Environmental Consequences and Mitigation Measures

3.11.3.1 Significance Criteria

Impacts to wetlands and riparian zones would be considered significant if the Proposed Action or alternatives resulted in any of the following:

- Violations of EO 11990 - Protection of Wetlands;
- Effects that are inconsistent with the objectives set forth in the BLM Riparian Initiative; or
- Eliminate, reduce, or adversely affect wetlands, riparian, or phreatophytic vegetation areas within the area directly or indirectly affected by Project activities.

3.11.3.2 Assessment Methodology

Potential effects on wetlands and riparian zones can be categorized as direct and indirect, as well as short term (i.e., during the life of the Project) and long term. Direct effects on wetlands and riparian zones could include removal or disturbance of riparian and wetland communities. Indirect effects could result from water table drawdown as a result of mine dewatering systems and well field pumping for process water. Short-term impacts are those that could occur during Project implementation and until reclamation is complete. Long-term impacts are those occurring after reclamation is complete. The effects are determined to be significant or not significant based on the applicable significance criteria listed in Section 3.11.3.1.

3.11.3.3 Proposed Action

Riparian and wetland communities that provide important habitat for local and migratory wildlife and fish species are considered sensitive resources, providing ecosystem services such as nutrient cycling, and also providing values such as irrigation and fisheries and are of concern to federal and state agencies. Riparian systems also provide water and habitat to wild horses and water to livestock. There are no jurisdictional wetlands or any other wetlands within the proposed areas of disturbance. Impacts to springs and stream water flows are discussed in Section 3.2.

- **Impact 3.11.3.3-1:** The Project would not result in the removal or disturbance **(direct impact)** of wetlands in the Project Area.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The mine dewatering system and pumping of the production well field is expected to drawdown the ground water table in an area surrounding the open pit. As discussed in Section 3.2, modeling results show that significant water table drawdowns in the aquifer would occur in an area measuring approximately 232 square miles around the Project Area including the northeast quadrant of Kobeh Valley and the southernmost fringe of the Roberts Mountains.

Phreatophytes that may be impacted as a result of the Proposed Action aquifer drawdown occur in Kobeh Valley. In the central Kobeh Valley, as discussed in Section 3.2 the shallow ground water (between zero and ten feet bgs) at the valley floor supports substantial areas of phreatophyte vegetation (Figure 3.9.2). As illustrated on Figure 3.2.9, approximately 4,122 acres of phreatophyte vegetation were mapped as occurring within the area predicted to be impacted by aquifer drawdown. More recent data from satellite imagery indicate that as many 28,500 acres of phreatophytes are located in Kobeh Valley (these data will be finalized upon publication) (USGS 2011). In order to verify the extent of phreatophytes

potentially impacted by the Project, the soil associations in Kobeh Valley were reviewed to determine which soils are associated with phreatophytes. This review identified Bubus loam (1010), Bubus-Dianev (1012), Ocala silt loam (161), Dianev silt loam (250), Brinnum silt loam (400), and Beanflat silt loam (410). The extent of these soils in Kobeh Valley is similar to the extent of phreatophytes identified in the preliminary results from the USGS Open-File Report 2011-1089 (USGS 2011), and are distributed southwest of the Project Area and overlap modeled ground water drawdown contours up to 70 feet in depth. However, the majority of phreatophytes that would be impacted are located in the area predicted to experience a ten- to 20-foot drawdown. Where the phreatophytes would be impacted as a result of ground water drawdown, the increase in the depth to ground water is expected to result in impacts to the phreatophyte vegetation through a change in vegetation composition and cover.

Impacts to other vegetation communities as a result of drawdown are not expected. The predicted ten-foot water drawdown contour for the Proposed Action does not intercept any known phreatophyte vegetation within Diamond Valley, Antelope Valley, or Pine Valley.

- **Impact 3.11.3.3-2: Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.**

  Significance of the Impact: The impact is **not** considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Direct impacts to the 0.22 acre of riparian vegetation associated with the Zinc adit are expected from the Project.

Water table drawdown would have a negative effect on wetland vegetation species dependent on seeps or springs. Lowering of the water table in the area where these plants occur would potentially cause a decline in the wetland community and the structure, functionality, and values offered by these systems. As the water table is lowered, the soils may dry out and these plants may decline due to water stress. Wetland plants that die as a result of water stress would likely be replaced by vegetation species that are not dependent on spring or seep water.

There are twenty-two existing springs**,** 7.7 miles of perennial streams in the Roberts Creek and Henderson Creek drainage**, and 61.4 acres of riparian areas associated with these creeks that** occur within the ten-foot drawdown contour (Figure 3.9.2). Table 3.2-6 in the Water Resources - Water Quantity Section identifies those springs that may be affected as a result of the Proposed Action. The total area of riparian vegetation that may be indirectly affected by the decline in the water table is approximately four acres associated with springs and **61.4** acres associated with the 7.7 miles of perennial streams.

- **Impact 3.11.3.3-3:** Vegetation dependent on springs, seeps, and perennial streams (i.e., riparian vegetation) would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water

table. Lowering of the water table in the area where these plants are located would potentially cause a decline in the riparian vegetation community. **Additionally, direct impacts to the 0.22 acre of riparian vegetation associated with the Zinc adit are expected from the Project.**

Significance of the Impact: Potential impacts to riparian vegetation areas within the area directly or indirectly affected by Project activities would be monitored as outlined in Section 2.1.15 and in the Plan. The impact is considered potentially significant.

- **Mitigation Measure 3.11.3.3-3:** As stated in Mitigation Measure 3.2.3.3-2a specific mitigation for the two perennial stream segments and 22 perennial or potentially perennial spring sites are outlined in Table 3.2-9. Implementation of the mitigation outlined in this table would result in up to 46.3 acres of additional surface disturbance associated with the pipeline construction and maintenance. This supplemental water should sustain riparian vegetation. **EML, in coordination with the BLM, would identify sites for mitigation in the area affected and implement mitigation measures at a three to one ratio with local cuttings, plugs, or seeds within one year of direct disturbance. EML would monitor these sites on an annual basis for at least three years after treatment to ensure effectiveness.**

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.2.3.3-2a is designed to address the specific spring or surface water that is affected, which enhances the effectiveness of the mitigation. In addition, a variety of approaches to mitigation can be used within these measures to achieve the objective. These mitigation measures are expected to be effective because the mitigation measures are specifically intended to directly address the impact by restoring or enhancing surface flows, and because the measures would be reviewed and addressed by the BLM. Mitigation Measure 3.11.3.3-3 would reduce impacts to the loss of riparian vegetation during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the loss of riparian vegetation.

3.11.3.3.1 Residual Adverse Impacts

Following Project completion and reclamation, residual adverse impacts to riparian zones from the Proposed Action would consist of a gradual return of flows to those springs, seeps, and perennial streams that experienced reduced flows from the ground water pumping. In addition, up to 0.22 acre of riparian vegetation within the Project Area would be removed through Project activities.

3.11.3.4 No Action Alternative

Under the No Action Alternative, the proposed Project would not be developed and associated impacts to wetlands and riparian zones would not occur. EML would continue existing activities under previously permitted Notices, and the area would remain available for future mineral development or for other purposes as approved by the BLM.

3.11.3.4.1 Residual Adverse Impacts

There are no residual adverse impacts to wetlands and riparian zones associated with the No Action Alternative.

3.11.3.5 Partial Backfill Alternative

Although the Partial Backfill Alternative would involve the partial backfilling of the open pit to eliminate the pit lake and the floor of the open pit (approximately 527 acres) would be reclaimed with growth media and seeded, the impacts to wetland and riparian areas would be similar to those described for the Proposed Action. The absence of water in the open pit would increase the amount of water available to wetlands and riparian areas as compared to the Proposed Action, particularly related to areas close to the open pit. Under this alternative, approximately 100 afy in evaporation from the pit lake would be prevented, and presumably that water would affect ground water resources.

- **Impact 3.11.3.5-1:** The Partial Backfill Alternative would not result in the possible removal or disturbance of wetlands in the Project Area.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.11.3.5-2: Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.**

  Significance of the Impact: The impact is **not** considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.11.3.5-3:** Vegetation dependent on springs, seeps, and perennial streams (i.e., riparian vegetation) would potentially experience water stress due to the water table drawdown associated with mine dewatering and subsequent filling of the open pit. Lowering of the water table in the area where these plants are located would potentially cause a decline in the riparian vegetation community. **Additionally, direct impacts to the 0.22 acre of riparian vegetation associated with the Zinc adit are expected from the Project.**

  Significance of the Impact: Potential impacts to riparian vegetation areas within the area directly or indirectly affected by Project activities would be monitored as outlined in Section 2.1.15 and the Plan. The impact is considered potentially significant.

- **Mitigation Measure 3.11.3.5-3:** As stated in Mitigation Measure 3.2.3.3-2a, specific mitigation for the two perennial stream segments and 22 perennial or potentially

perennial spring sites are outlined in Table 3.2-9. Implementation of the mitigation outlined in this table would result in up to 46.3 acres of additional surface disturbance associated with the pipeline construction and maintenance. This supplemental water should sustain riparian vegetation. **EML, in coordination with the BLM, would identify sites for mitigation in the area affected and implement mitigation measures at a three to one ratio with local cuttings, plugs, or seeds within one year of direct disturbance. EML would monitor these sites on an annual basis for at least three years after treatment to ensure effectiveness.**

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.2.3.3-2a is designed to address the specific spring or surface water that is affected, which enhances the effectiveness of the mitigation. In addition, a variety of approaches to mitigation can be used within these measures to achieve the objective. These mitigation measures are expected to be effective because the mitigation measures are specifically intended to directly address the impact by restoring or enhancing surface flows, and because the measures would be reviewed and addressed by the BLM. Mitigation Measure 3.11.3.5-3 would reduce impacts to the loss of riparian vegetation during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the loss of riparian vegetation.

3.11.3.5.1 Residual Adverse Impacts

Following Project completion and reclamation, residual adverse impacts to wetland and riparian zones from the Partial Backfill Alternative would consist of a gradual return of flows to those springs, seeps, and perennial streams that had reduced flows from the ground water pumping. In addition, up to 0.22 acre of riparian vegetation within the Project Area would be removed through Project activities.

3.11.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Although the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in approximately 20 acres less surface disturbance compared to the Proposed Action, impacts to riparian areas from this alternative would be similar to those for the Proposed Action.

- **Impact 3.11.3.6-1:** The Off-Site Transfer of Ore Concentrate for Processing Alternative would not result in the removal or disturbance of wetlands in the Project Area.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.11.3.6-2: Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.**

Significance of the Impact: The impact is **not** considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.11.3.6-3:** Vegetation dependent on springs, seeps, and perennial streams (i.e., riparian vegetation) would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area where these plants are located would potentially cause a decline in the riparian vegetation community. **Additionally, direct impacts to the 0.22 acre of riparian vegetation associated with the Zinc adit are expected from the Project.**

  Significance of the Impact: Potential impacts to riparian vegetation areas within the area directly or indirectly affected by Project activities would be monitored as outlined in Section 2.1.15 and the Plan. The impact is considered potentially significant.

- **Mitigation Measure 3.11.3.6-3:** As stated in Mitigation Measure 3.2.3.3-2a, specific mitigation for the two perennial stream segments and 22 perennial or potentially perennial spring sites are outlined in Table 3.2-9. Implementation of the mitigation outlined in this table would result in 46.3 acres of additional surface disturbance associated with the pipeline construction and maintenance. This supplemental water should sustain riparian vegetation. **EML, in coordination with the BLM, would identify sites for mitigation in the area affected and implement mitigation measures at a three to one ratio with local cuttings, plugs, or seeds within one year of direct disturbance. EML would monitor these sites on an annual basis for at least three years after treatment to ensure effectiveness.**

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.2.3.3-2a is designed to address the specific spring or surface water that is affected, which enhances the effectiveness of the mitigation. In addition, a variety of approaches to mitigation can be used within these measures to achieve the objective. These mitigation measures are expected to be effective because the mitigation measures are specifically intended to directly address the impact by restoring or enhancing surface flows, and because the measures would be reviewed and addressed by the BLM. Mitigation Measure 3.11.3.5-3 would reduce impacts to the loss of riparian vegetation during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the loss of riparian vegetation.

3.11.3.6.1 Residual Adverse Impacts

Following Project completion and reclamation, residual adverse impacts to wetland and riparian zones from the Off-Site Transfer of Ore Concentrate for Processing Alternative would consist of a gradual return of flows to those springs, seeps, and perennial streams that had reduced flows from the ground water pumping. In addition, up to 0.22 acre of riparian vegetation within the Project Area would be removed through Project activities.

3.11.3.7 Slower, Longer Project Alternative

Impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action. As discussed in Section 3.2.3, the surface area predicted to be impacted by the drawdown by this alternative is similar to, but slightly different than, the Proposed Action. The differences between the predicted drawdown area is illustrated on Figure 3.2.28. Impacts to riparian vegetation as a result of the Slower, Longer Project Alternative are expected to be similar to the Proposed Action at the end of the Project.

- **Impact 3.11.3.7-1:** The Slower, Longer Project Alternative would not result in the removal or disturbance of wetlands in the Project Area.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.11.3.7-2: Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.**

  Significance of the Impact: The impact is **not** considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.11.3.7-3:** Vegetation dependent on springs, seeps, and perennial streams (i.e., riparian vegetation) would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area where these plants are located would potentially cause a decline in the riparian vegetation community. **Additionally, direct impacts to the 0.22 acre of riparian vegetation associated with the Zinc adit are expected from the Project.**

  Significance of the Impact: Potential impacts to riparian vegetation areas within the area directly or indirectly affected by Project activities would be monitored as outlined in the Plan. The impact is considered potentially significant.

- **Mitigation Measure 3.11.3.7-3:** As stated in Mitigation Measure 3.2.3.3-2a, specific mitigation for the two perennial stream segments and 22 perennial or potentially perennial spring sites are outlined in Table 3.2-9. Implementation of the mitigation outlined in this table would result in up to 46.3 acres of additional surface disturbance associated with the pipeline construction and maintenance. This supplemental water should sustain riparian vegetation. **EML, in coordination with the BLM, would identify sites for mitigation in the area affected and implement mitigation measures at a three to one ratio with local cuttings, plugs, or seeds within one year of direct**

disturbance. EML would monitor these sites on an annual basis for at least three years after treatment to ensure effectiveness.

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.2.3.3-2a is designed to address the specific spring or surface water that is affected, which enhances the effectiveness of the mitigation. In addition, a variety of approaches to mitigation can be used within these measures to achieve the objective. These mitigation measures are expected to be effective because the mitigation measures are specifically intended to directly address the impact by restoring or enhancing surface flows, and because the measures would be reviewed and addressed by the BLM. Mitigation Measure 3.11.3.5-3 would reduce impacts to the loss of riparian vegetation during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the loss of riparian vegetation.

3.11.3.7.1 Residual Adverse Impacts

Following completion and reclamation, residual adverse impacts to wetland and riparian zones from the Slower, Longer Project Alternative would consist of a gradual return of flows to those springs, seeps, and perennial streams that experienced reduced flows from the ground water pumping. In addition, up to 0.22 acre of riparian vegetation within the Project Area would be removed through Project activities.

3.12 Livestock Grazing and Production

3.12.1 Regulatory Framework

BLM Standards and Guidelines for Livestock Grazing

The BLM has established Standards and Guidelines approved by the Secretary of the Interior (43 CFR 4180). The purpose of these Standards and Guidelines is to ensure that BLM administration of grazing helps preserve currently healthy conditions and restores healthy conditions of rangelands (BLM 2001).

BLM Resource Management Plan

The RMP that covers the Project Area includes rangeland programs that authorize livestock grazing on public lands (43 CFR 1601.0-5(b) and CFR 4100.08). The regulations require that the BLM manage livestock grazing on public lands under the principles of multiple use and sustained yield. To accomplish this, rangeland has been broken down into controllable land areas called allotments to manage both short- and long-term objectives for livestock grazing. Allotments are leased to permittees for a defined period of time. **BLM MLFO allotments are managed to achieve Northeast Great Basin Resource Advisory Council standards and guidelines**. They are evaluated periodically by the BLM to determine whether management goals are being met (BLM 2001).

3.12.2 Affected Environment

3.12.2.1 Study Methods

This section includes a discussion of existing grazing allotments, types and classes of livestock, and active grazing preferences, as well as the current grazing practices and management strategies within the Project Area.

3.12.2.2 Existing Conditions

The Project Area is located within six BLM grazing allotments: Lucky C; Roberts Mountain; Romano; Ruby Hill; Shannon Station; and 3 Bars (Figure 3.12.1). Although not located within the Project Area footprint, the Santa Fe/Ferguson Allotment is located within the maximum extent ten-foot ground water drawdown contour and is included in Table 3.12-1 below. **Associated with each of these seven allotments are private lands that are used for livestock grazing and production.** Season of use and type of livestock permitted on the seven allotments are detailed in Table 3.12-1.

Table 3.12-1: Livestock Grazing Permits for the Grazing Allotments Located within the Project Area and Ten-foot Ground Water Drawdown Contour

Grazing Allotment	Type of Livestock	Season of Use	Active Preference (AUMs)
Lucky C	Cattle	4/15 through 2/28	3,054
		Subtotal	**3,054**
Roberts Mountain	Cattle	3/01 through 2/28	7,314
	Sheep	4/10 through 10/15	2,310
		Subtotal	**9,624**
Romano	Cattle	5/01 through 12/31	2,887
		Subtotal	**2,887**
Ruby Hill	Cattle	3/16 through 8/29	275
	Sheep	5/1 through 9/30	1,011
		Subtotal	**1,286**
Shannon Station	Cattle	4/1 through 2/28	2,520
		Subtotal	**2,520**
3 Bars	Cattle	3/1 through 2/28	4,111
	Sheep	3/1 through 2/28	1,729
		Subtotal	**5,840**
Santa Fe/Ferguson	Cattle	3/1 through 12/1	2,767
	Sheep	3/1 through 12/1	1,227
		Subtotal	**3,994**
		TOTAL	**29,205**

The Lucky C Allotment includes approximately 108,666 acres of public land. The active grazing preference for the allotment is 3,054 animal unit months (AUMs) for cattle, or approximately

36 acres per AUM and is under a rotational grazing system. An AUM is the amount of forage **necessary for the sustenance of one cow or its equivalent for a period of one month**. A total of **909.5** acres of the Lucky C Allotment are located in the powerline portion of the Project Area. **In addition, the ten-foot drawdown contour overlaps with the phreatophytes located within this allotment (Figure 3.12.1). According to Figure 3.12.1, this area would cover 3,143 acres (2.89 percent of this allotment).**

The Roberts Mountain Allotment includes approximately 151,060 acres of public land. The active grazing preference for the allotment is 9,624 AUMs for cattle and sheep, or on average approximately 16 acres per AUM. The allotment is currently under a rotation grazing system. A total of 7,954 acres of the Roberts Mountain Allotment are located in the fenced portion of the Project Area (of this, 1,365 acres are located in the Henderson pasture and 6,589 acres in the Nichols pasture).

The Romano Allotment consists of 76,070 acres of public lands with an active grazing preference of 2,887 AUMs for cattle, or approximately 26 acres per AUM (although AUMs/acre vary depending on pastures). This allotment is currently under a rotation grazing system. A total of 6,252 acres of the Romano Allotment are located in the fenced portion of the Project Area.

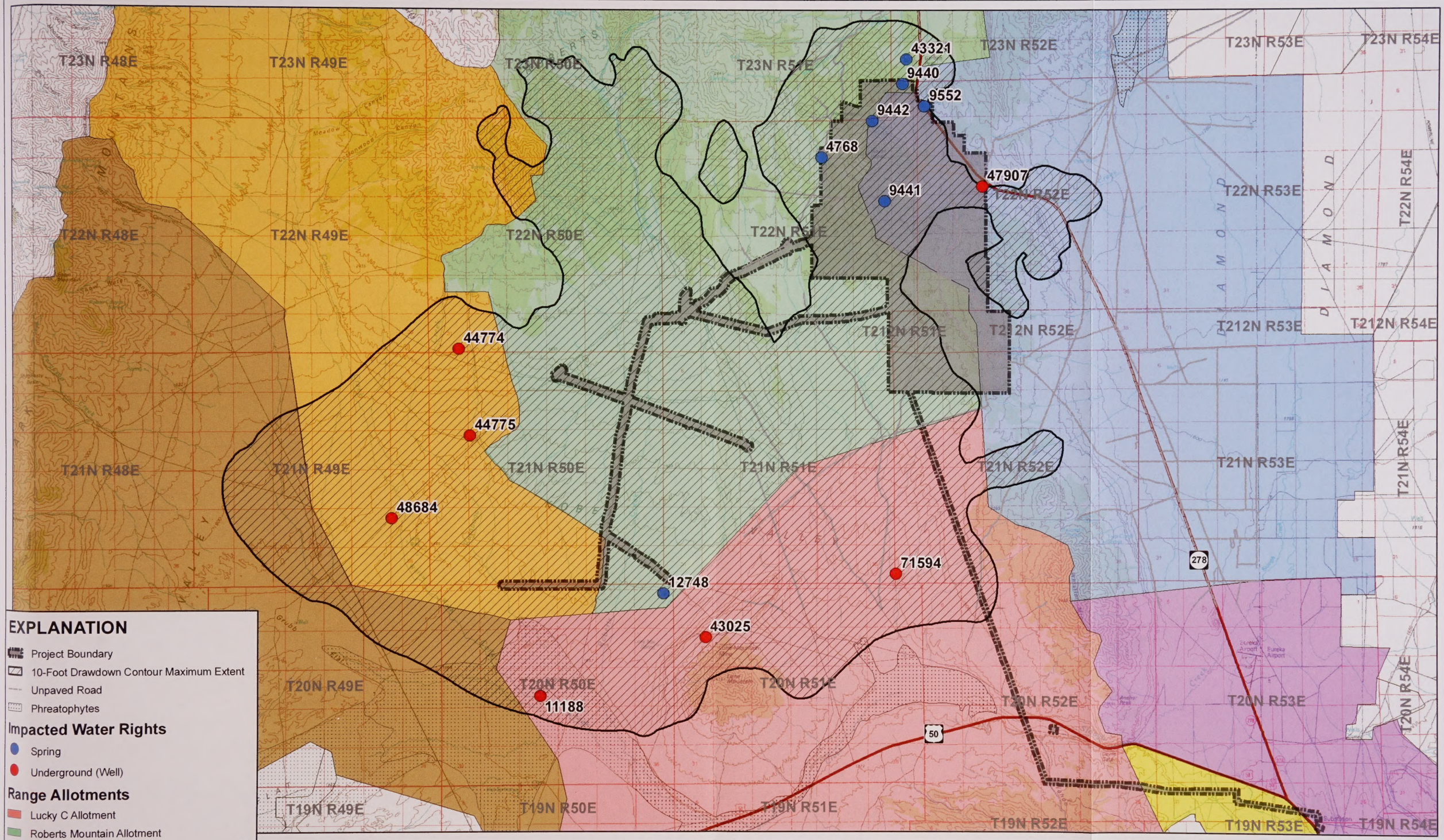
The Ruby Hill Allotment includes approximately 14,659 acres of public land. The active grazing preference for the allotment is 1,286 AUMs for cattle and sheep, or approximately 11 acres per AUM. A total of **317.7** acres of the Ruby Hill Allotment are located in the powerline portion of the Project Area.

The Shannon Station Allotment includes approximately 32,888 acres of public land. The active grazing preference for the allotment is 2,520 AUMs for cattle, or approximately 13 acres per AUM. The allotment is currently under a rotation grazing system. A total of **65.1** acres of the Shannon Station Allotment is located in the powerline portion of the Project Area.

The 3 Bars Allotment includes approximately 76,740 acres of public land. The active grazing preference for the allotment is 5,840 AUMs for cattle and sheep, or approximately 13 acres per AUM. The allotment is currently under a rotation grazing system. A total of 1,157 acres of the 3 Bars Allotment is located in the well field portion of the Project Area. **In addition, the ten-foot drawdown contour overlaps with the phreatophytes located within this allotment (Figure 3.12.1). According to Figure 3.12.1, this area would cover five acres (0.007 percent of this allotment).**

In addition to the six allotments discussed above, the ten-foot drawdown contour **overlaps with the phreatophytes located in** a seventh allotment, the Santa Fe/Ferguson Allotment (Figure 3.12.1). **According to Figure 3.12.1, this area would cover 974 acres (1.2 percent of the allotment).** The Santa Fe/Ferguson Allotment includes approximately 84,375 acres of public land. The active grazing preference for the allotment is 3,994 AUMs for cattle and sheep, or approximately 21 acres per AUM. The allotment is currently under a rotation grazing system.

The following BLM range improvements have been authorized within Sections affected by the entire Project Area: one well; one fence; one fence/cattleguard; one pipeline/trough; one pipeline; two seeding projects; one seeding tank; two spring developments; and one reservoir dam.



EXPLANATION

- Project Boundary
- 10-Foot Drawdown Contour Maximum Extent
- Unpaved Road
- Phreatophytes

Impacted Water Rights

- Spring
- Underground (Well)

Range Allotments

- Lucky C Allotment
- Roberts Mountain Allotment
- Romano Allotment
- Ruby Hill Allotment
- Santa Fe/Ferguson Allotment
- Shannon Station Allotment
- 3 Bars Allotment

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No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

0 1 2 3 4 5 6 7 Miles

IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD
CHECKED: -	APPROVED: RFD	DATE: 07/31/2012

FILE NAME: p1635_Fig3-12-1_RangeAllotments.mxd

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Range Allotments

Figure 3.12.1

The consequences of weather and climate change on livestock grazing, and grassland use can be subtle and complex. The projected changes in climate – increases in temperature, reductions in soil moisture, and more intense rainfall events – may require changes in livestock management. The availability of feed and water for livestock grazing is extremely vulnerable to drought; hence the carrying capacity of land may influence livestock management.

3.12.3 Environmental Consequences and Mitigation Measures

3.12.3.1 Significance Criteria

Impacts to livestock grazing and production would be considered significant if the Proposed Action or alternatives would result in any of the following:

- Change in forage availability that measurably affects livestock grazing;
- Change in access to water that measurably affects livestock grazing;
- Change in number of AUMs available before, during, and after mining; or
- Undue harassment that adversely affects livestock grazing.

3.12.3.2 Assessment Methodology

Environmental consequences to livestock grazing and production within the Project Area were evaluated using authorized AUMs, pasture/use area acres, and Project disturbance acres. The pasture/use area acres were divided by the total AUMs by pasture (acres/AUM). The Project disturbance within each pasture was then divided by the acres/AUM to determine the total AUMs impacted. Where an allotment did not have pastures or use areas, the total acres and authorized AUMs were utilized for the calculation. **The analysis of effects to livestock grazing and production from the ground water drawdown, utilizes the acreage of phreatophytes within allotments affected by the ten-foot drawdown contour.**

3.12.3.3 Proposed Action

Project-related activities could result in direct impacts to livestock from traffic accidents or other mine-related activities. In order to minimize these impacts, a perimeter fence would be constructed during Project activities that would enclose 14,204 acres in the Mine and Process Area, which includes the open pit, WRDFs, and TSFs. The constructed fence would exclude livestock grazing during mine operations and reclamation for approximately 70 years. The open pit would result in the permanent loss of approximately 734 acres (644 acres within the Romano Allotment and 90 acres within the Roberts Mountain Allotment). **A total of 32 AUMs in the Romano and Roberts Mountain Allotments would be lost in perpetuity as a result of the open pit.** As described in the Proposed Action, the fence would be monitored on a regular basis and repairs made as needed.

When an area **of BLM administered land is devoted to** a single **public purpose**, such as mineral production, AUMs are adjusted to reflect the area withdrawn from multiple use. These AUMs are lost until such time mining has ceased and reclamation has been successfully completed. At that time, the area will be evaluated to determine if the AUMs can be returned.

In addition to the AUMs permanently lost as a result of the open pit, a total of 490 AUMs in the Roberts Mountain Allotment would be lost **for approximately 70 years** as a result of

7,954 acres being excluded by the Project fence. This would reduce the active grazing preference to 9,134 AUMs in the allotment from 9,624 AUMs (Table 3.12-2). The loss of AUMs represents five percent of the active grazing preference in the Roberts Mountain Allotment.

In addition to the AUMs permanently lost as a result of the open pit, a total of 291 AUMs in the Romano Allotment would be lost **for approximately 70 years** as a result of 6,252 acres being excluded by the Project fence. This would reduce the active grazing preference to 2,596 AUMs in the allotment from 2,887 AUMs (Table 3.12-2). The loss of AUMs represents ten percent of the active grazing preference in the Romano Allotment.

Table 3.12-2: Grazing Capacity within the Project Area and Area Affected by Ten-Foot Water Drawdown Contour Before and During Project Activities

Allotment	Active Grazing Capacity (AUMs)	
	Before the Proposed Action	During the Proposed Action
Lucky C	3,054	3,054
Roberts Mountain	9,624	9,134
Romano	2,887	2,596
Ruby Hill	1,286	1,286
Shannon Station	2,520	2,520
3 Bars	5,840	5,840
Santa Fe/Ferguson	3,994	3,994
Total	29,205	28,424

The grazing and agricultural service sectors of the Eureka County economy would be marginally affected by the reduction in AUMs associated with the Proposed Action due to the construction of the fence around 14,204 acres of the Project Area. The fence would exclude access to portions of the Roberts Mountains and Romano Allotments and result in **a** reduction of 781 AUMs for approximately 70 years **and 32 AUMs permanently from the development of the open pit**. According to the Nevada Grazing Statistics Report and Economic Analysis for Federal Lands in Nevada (Resource Concepts, Inc. 2001), the **total** economic **impact** associated with **each** AUM **equals** $53.40 (1999 dollars) **($73.75 in 2012 dollars) annually. This value specifically estimates** the direct, indirect, and induced impacts **of industry output and added value of grazing in Nevada. Applying this value to the AUMs permanently and temporarily displaced under the Proposed Action, the total economic impact could be an annual reduction of** $41,705 (1999 dollars) **($57,597 in 2012 dollars). This would be a $15,539 (1999 dollars) ($21,460 2012 dollars) impact resulting from displaced Romano Allotment AUMs and a $26,166 (1999 dollars) ($36,137 2012 dollars) impact resulting from displaced Roberts Mountain Allotment AUMs. While the impact may not be significant to the ranching community, the impact may be meaningful to individual ranch operations. However, it is important to note that this impact reflects the total economic impact, not lost revenue for specific operators. The subsequent two paragraphs describe in greater detail the economic impact to grazing investigated in the Nevada Grazing Statistics Report and Economic Analysis for Federal Lands in Nevada Report.**

The direct industry impacts to Nevada's economy from one AUM are estimated to be $24.40 based on the total production value of grazing divided by the total AUMs. Indirect and induced impacts to the industry, estimated at $16.00 per AUM, occur throughout the economy as a result

of providing goods and services to the livestock industry and include other industrial sectors such as crops, construction, manufacturing, transportation, communication, utilities, and trade and services. Induced impacts include those caused by household consumption as a result of the direct and indirect impacts. In total, industry impacts were estimated to equal $40.40 per AUM (1999 dollars).

The labor income impact estimates (total $7.40 per AUM) are based on the wages and salaries of workers and proprietors' income. Total value-added impacts ($13.00 per AUM) include impacts to wages and salaries, proprietors' income, other property income (i.e., interest, rent, royalties), and indirect business taxes (1999 dollars). Employment impacts based on $24.40 direct industry impacts are too small to have any impact based on one AUM.

Based on the estimated direct, indirect, and induced economic impacts of one AUM ($53.40), the economic value of the 781 AUMs reduced during the life of the Project equates to $41,705.40 per year, or in sum $2,919,378.00 over approximately 70 years. This represents approximately 2.7 percent of the economic value of all the allotments affected by the Project. The permanent loss of 32 AUMs (valued at $1,708.80 annually **in 1999 dollars**) represents less than one percent of all allotments affected by the Project and, therefore, is considered a minor impact on the long-term Eureka County grazing economy.

Table 3.12-2 includes the active preference before and during the Project for the affected allotments. The loss of 781 AUMs represents 2.7 percent of the active grazing preference for the allotments in the Project Area.

- **Impact 3.12.3.3-1: Project development and operation under the Proposed Action would result in the permanent loss of 32 AUMs and the loss of 781 AUMs for approximately 70 years from allotments within the fenced Project Area.**

  Significance of the Impact: The impact is considered potentially significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures. Also see Section 3.26 for suggested mitigation outside of the BLM's jurisdiction.

The 14,204-acre enclosure would not impact AUMs within the 3 Bars, Santa Fe/Ferguson, or Lucky C Allotments; however, portions of these allotments could **sustain** potential impacts to AUMs due to the possible impacts to forage in the phreatophyte vegetation community related to ground water drawdown. **Figure 3.12.1 illustrates the location of phreatophytes relative to the allotments within the Project Area boundary and the ten-foot drawdown contour. There are no phreatophytes on private land within the ten-foot drawdown.**

Ground water drawdown could result in a change from phreatophytes to another vegetation community composed of plant species that do not have long roots that reach down to the water table that would still provide forage for livestock. **Impacts are not expected to other vegetation communities that do not rely on the direct connection to ground water.** Additionally, reseeding mitigation proposed in Section 3.11.3 would ensure the availability of forage for livestock in areas identified by the BLM. **Following reseeding, the BLM would evaluate and determine if there is a need to suspend livestock grazing for two years or until the objectives of the seeding are met. The BLM would utilize rangeland standards as a goal**

following reseeding and revegetation. Impacts to other vegetation communities as a result of drawdown are not expected. Therefore, impacts to overall AUM availability within the allotments as a result of the drawdown are not expected.

- **Impact 3.12.3.3-2: Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Although the lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities, it is possible that the changes in phreatophyte community would result in a loss of forage productivity. Impacts to other vegetation communities as a result of drawdown are not expected.**

  Significance of the Impact: The impact is considered potentially significant. The following mitigation has been identified for this impact.

- **Mitigation Measure 3.12.3.3-2: The BLM would monitor for changes to forage productivity as a result of ground water drawdown associated with Project-related ground water pumping. If the BLM detects a loss of forage productivity attributed to the Project, the BLM would develop and provide EML with a list of appropriate seed mixes for those areas within and outside the Project Area impacted by water table drawdown that should be seeded. The nature of the seed mix may vary depending on the conditions encountered as a result of the drawdown. If the BLM determines reseeding to be necessary, the BLM would coordinate the conditions for reseeding (including a possible two-year grazing closure) with local permittees in order to reduce impacts to AUMs. Mitigation for the potential loss of water available for livestock from stock water rights and other surface waters are described in the Water Resources - Water Quantity impacts discussion (Mitigation Measures 3.2.3.3-2 and 3.2.3.3-3). Mitigation for loss of water available would also mitigate the loss of vegetation (livestock forage).**

- **Effectiveness of Mitigation and Residual Effects: Mitigation measure 3.12.3.3-2 would reduce potential impacts to local permittees from changes in vegetation species composition and percent cover as a result of water table drawdown during Project activities. Monitoring vegetation and possible reseeding with an appropriate seed mix, as well as BLM coordination with local permittees following reseeding, would reduce the long-term impacts to AUMs, although short-term impacts may occur while any reseeding effort is implemented. If a two-year suspension is required, impacts would persist until the suspension is lifted, in an amount proportionate to the amount of AUMs temporarily suspended.**

Mine dewatering, ground water pumping, **and** subsequent recovery of the water table is expected to draw down the ground water table in an area surrounding the open pit. As discussed in Section 3.2, modeling results show that significant water table drawdown in the aquifer would occur in an area measuring approximately 232 square miles around the Project Area, including the northeast quadrant of Kobeh Valley and the southernmost fringe of Roberts Mountains. Stock water resources within the ten-foot drawdown contour from Proposed Action pumping include water rights within the Romano, Lucky C, Roberts Mountain, 3 Bars, and Santa Fe/Ferguson Allotments. Eighteen existing stock water rights occurring within the ten-foot drawdown area

may experience negative impacts including a reduction in available water or complete water loss as a result of ground water drawdown associated with the Proposed Action (Figure 3.12.1). Table 3.2-7 in the Water Resources - Water Quantity Section identifies the water rights associated with stock water that would be located within the ten-foot drawdown contour from the Proposed Action activities. Twenty-two springs and two segments of perennial streams are also located within the area predicted to be impacted by the ground water drawdown. Livestock that utilize those sources of water could be affected. Springs predicted to be impacted are shown on Figure 3.2.9.

Livestock require water year long to satisfy physiological requirements. The reduction or loss of existing water sources could impact livestock in the Project Area. A reduction in surface water could **also** affect the amount of foraging habitat for livestock**, as discussed previously**.

- **Impact 3.12.3.3-3:** Livestock dependent on existing water sources in the Project Area would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table could result in reduced water available for use in rangeland management.

  Significance of the Impact: The impact could be potentially significant. **The following** mitigation **has been identified for this impact**.

- **Mitigation Measure 3.12.3.3-3:** Mitigation for the potential loss of water availa**bility** for livestock from stock water rights and other surface waters are described in the Water Resources - Water Quantity impacts discussion (Mitigation Measures 3.2.3.3-2 and 3.2.3.3-3). **Implementation of any of the specific mitigation outlined in these measures for springs located on private land would be subject to the authorization of the private land owner. Mitigation for loss of water available would also mitigate the loss of vegetation (livestock forage). Additionally, where livestock and wild horse use overlap those mitigation measures identified for wild horses (Mitigation Measure 3.13.3.3-1) would also benefit livestock.**

- **Effectiveness of Mitigation and Residual Effects:** Implementation of Mitigation Measures in Section 3.2.3 would effectively mitigate any reductions in water available for use in rangeland management (i.e., this includes livestock grazing)**, with the exception of impacts to forage on private land associated with riparian areas. The BLM cannot require a private land owner to consent to the implementation of mitigation on their private land; therefore, there is a potential loss of forage associated with the riparian areas on private land.** Ongoing monitoring included in the mitigation measures would ensure that adequate water supplies are maintained and available for livestock.

No impacts to existing range improvements other than developed spring sites **and removal of existing fencing within the Project fence** are anticipated.

The evaluation of the potential effects of the pit lake on livestock used a screening level ecological risk assessment (SLERA). The general approach used in the preparation of the SLERA is similar to that developed by the Environmental Sciences Division and Life Sciences Division of Oak Ridge National Laboratory for the U.S. Department of Energy. In addition, the SLERA incorporated more recent toxicity reference values (TRVs) for certain inorganic

chemical constituents derived by the EPA (SRK 2009). Together, these were used to develop species-specific toxicity criteria to which the predicted constituents in the pit water were compared.

Protective criteria for the surrogate species are likely to be protective of local species occupying similar ecological niches at the Project Area. Additionally, it was assumed that the livestock receptors would consume water from the pit lake; and, that this water would constitute 100 percent of each species individual daily water requirements (i.e., no outside sources of water would be utilized over the life of the animal). This is considered an extremely conservative assumption.

The results of the assessment indicate that the most likely predicted water quality of the modeled future pit lake water at the Project Area could represent a low to moderate toxicological threat to livestock based on Nevada's beneficial use standard for livestock watering. However, since this water is not intended to be a livestock watering source **and livestock access would be restricted by the construction of the pit perimeter berm**, and the standards were based on limited toxicological information, the probable risk to livestock from the pit lake created under the Proposed Action would be low.

The majority of disturbed lands within the 14,204-acre enclosure would be reclaimed and available for future grazing. Successful revegetation of disturbed lands would increase plant cover and provide an adequate amount of forage to recover the majority of AUMs lost during the Project. Once vegetation has been successfully re-established (BLM/NDEP standards), the BLM would **re-**evaluate livestock **grazing** in the Project Area.

3.12.3.3.1 Residual Adverse Impacts

The Proposed Action would result in the unavoidable permanent loss of **32 AUMs from the development of the open pit and the loss of 781 AUMs for approximately 70 years from allotments within the fenced Project Area**.

3.12.3.4 No Action Alternative

Under the No Action Alternative, the proposed Project would not be developed and associated impacts to livestock grazing and production would not occur. EML would continue existing activities under previously permitted Notices, and the area would remain available for future mineral development or for other purposes as approved by the BLM.

3.12.3.4.1 Residual Adverse Impacts

There would be no residual adverse impacts to livestock grazing and production under the No Action Alternative.

3.12.3.5 Partial Backfill Alternative

Impacts to livestock grazing and production would be similar to those described for the Proposed Action; however, the Partial Backfill Alternative would involve the partial backfilling of the open pit to eliminate the pit lake, and the floor of the backfilled open pit (approximately 527 acres) would be reclaimed with growth media and seeded. **Because the pit lake would be**

eliminated, there would be no potential for adverse impacts due to livestock drinking water from the pit lake. Livestock, however, would continue to be excluded from the open pit area, and impacts under this alternative would **otherwise** be similar to those described for the Proposed Action.

- **Impact 3.12.3.5-1:** Project development and operation under the Partial Backfill Alternative would result in the **permanent loss of 32 AUMs and the** loss of 781 AUMs **for approximately 70 years** from allotments within the fenced Project Area.

  Significance of the Impact: The impact is considered potentially significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures. Also see Section 3.26 for suggested mitigation outside of the BLM's jurisdiction.

Impacts to forage productivity as a result of the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table under the Partial Backfill Alternative would be similar to those impacts described for the Proposed Action.

- **Impact 3.12.3.5-2: Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Although the lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities, it is possible that the changes in phreatophyte community would result in a loss of forage productivity. Impacts to other vegetation communities as a result of drawdown are not expected.**

  Significance of the Impact: The impact is considered potentially significant. The following mitigation has been identified for this impact.

- **Mitigation Measure 3.12.3.5-2: The BLM would monitor for changes to forage productivity as a result of ground water drawdown associated with Project-related ground water pumping. If the BLM detects a loss of forage productivity attributed to the Project, the BLM would develop and provide EML with a list of appropriate seed mixes for those areas within and outside the Project Area impacted by water table drawdown that should be seeded. The nature of the seed mix may vary depending on the conditions encountered as a result of the drawdown. If the BLM determines reseeding to be necessary, the BLM would coordinate the conditions for reseeding (including a possible two-year grazing closure) with local permittees in order to reduce impacts to AUMs. Mitigation for the potential loss of water available for livestock from stock water rights and other surface waters are described in the Water Resources - Water Quantity impacts discussion (Mitigation Measures 3.2.3.3-2 and 3.2.3.3-3). Mitigation for loss of water available would also mitigate the loss of vegetation (livestock forage).**

- **Effectiveness of Mitigation and Residual Effects: Mitigation measure 3.12.3.5-2 would reduce potential impacts to local permittees from changes in vegetation**

species composition and percent cover as a result of water table drawdown during Project activities. Monitoring vegetation and possible reseeding with an appropriate seed mix, as well as BLM coordination with local permittees following reseeding, would reduce the long-term impacts to AUMs, although short-term impacts may occur while any reseeding effort is implemented. If a two year suspension is required, impacts would persist until the suspension is lifted, in an amount proportionate to the amount of AUMs temporarily suspended.

- **Impact 3.12.3.5-3:** Livestock dependent on existing water sources in the Project Area would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table could result in reduced water available for use in rangeland management.

Significance of the Impact: The impact could be potentially significant. **The following** mitigation **has been identified for this impact**.

- **Mitigation Measure 3.12.3.5-3:** Mitigation for the potential loss of water availab**ility** for livestock is described in the Water Resources - Water Quantity impacts discussion (Mitigation Measures 3.2.3.3-2 and 3.2.3.3-3). **Implementation of any of the specific mitigation outlined in these measures for springs located on private land would be subject to the authorization of the private land owner. Mitigation for loss of water available would also mitigate the loss of vegetation (livestock forage). Additionally, where livestock and wild horse use overlap those mitigation measures identified for wild horses (Mitigation Measure 3.13.3.3-1) would also benefit livestock.**

- **Effectiveness of Mitigation and Residual Effects:** Implementation of Mitigation Measures in Section 3.2.3 would effectively mitigate any reductions in water available for use in rangeland management**, with the exception of impacts to forage on private land associated with riparian areas. The BLM cannot require a private land owner to consent to the implementation of mitigation on their private land; therefore, there is a potential loss of forage associated with the riparian areas on private land**. Ongoing monitoring included in the mitigation measures would ensure that adequate water supplies are maintained and available for livestock.

3.12.3.5.1 Residual Adverse Impacts

Residual impacts for livestock grazing and production under the Partial Backfill Alternative would be the loss of **32 AUMs from the development of the open pit and the loss of 781 AUMs for approximately 70 years from allotments within the fenced Project Area**.

3.12.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Although the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in approximately 20 acres less surface disturbance compared to the Proposed Action, impacts to livestock grazing and production from this alternative would be similar to those for the Proposed Action since the acreage would decrease by only 0.2 percent.

- **Impact 3.12.3.6-1:** Project development and operation under the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the **permanent loss of 32 AUMs**

and the loss of 781 AUMs **for approximately 70 years from allotments within the fenced Project Area**.

Significance of the Impact: The impact is considered potentially significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures. Also see Section 3.26 for suggested mitigation outside of the BLM's jurisdiction.

Impacts to forage productivity as a result of the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be similar to those impacts described for the Proposed Action.

- **Impact 3.12.3.6-2: Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Although the lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities, it is possible that the changes in phreatophyte community would result in a loss of forage productivity. Impacts to other vegetation communities as a result of drawdown are not expected.**

  Significance of the Impact: The impact is considered potentially significant. The following mitigation has been identified for this impact.

- **Mitigation Measure 3.12.3.6-2: The BLM would monitor for changes to forage productivity as a result of ground water drawdown associated with Project-related ground water pumping. If the BLM detects a loss of forage productivity attributed to the Project, the BLM would develop and provide EML with a list of appropriate seed mixes for those areas within and outside the Project Area impacted by water table drawdown that should be seeded. The nature of the seed mix may vary depending on the conditions encountered as a result of the drawdown. If the BLM determines reseeding to be necessary, the BLM would coordinate the conditions for reseeding (including a possible two-year grazing closure) with local permittees in order to reduce impacts to AUMs. Mitigation for the potential loss of water available for livestock from stock water rights and other surface waters are described in the Water Resources - Water Quantity impacts discussion (Mitigation Measures 3.2.3.3-2 and 3.2.3.3-3). Mitigation for loss of water available would also mitigate the loss of vegetation (livestock forage).**

- **Effectiveness of Mitigation and Residual Effects: Mitigation measure 3.12.3.6-2 would reduce potential impacts to local permittees from changes in vegetation species composition and percent cover as a result of water table drawdown during Project activities. Monitoring vegetation and possible reseeding with an appropriate seed mix, as well as BLM coordination with local permittees following reseeding, would reduce the long-term impacts to AUMs, although short-term impacts may occur while any reseeding effort is implemented. If a two year suspension is**

required, impacts would persist until the suspension is lifted, in an amount proportionate to the amount of AUMs temporarily suspended.

- **Impact 3.12.3.6-3:** Livestock dependent on existing water sources in the Project Area would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table could result in reduced water available for use in rangeland management.

Significance of the Impact: The impact could be potentially significant. **The following** mitigation **has been identified for this impact**.

- **Mitigation Measure 3.12.3.6-3:** Mitigation for the potential loss of water availab**ility** for livestock is described in the Water Resources - Water Quantity impacts discussion (Mitigation Measures 3.2.3.3-2 and 3.2.3.3-3). **Implementation of any of the specific mitigation outlined in these measures for springs located on private land would be subject to the authorization of the private land owner. Mitigation for loss of water available would also mitigate the loss of vegetation (livestock forage). Additionally, where livestock and wild horse use overlap those mitigation measures identified for wild horses (Mitigation Measure 3.13.3.3-1) would also benefit livestock.**

- **Effectiveness of Mitigation and Residual Effects:** Implementation of Mitigation Measures in Section 3.2.3 would effectively mitigate any reductions in water available for use in rangeland management, **with the exception of impacts to forage on private land associated with riparian areas. The BLM cannot require a private land owner to consent to the implementation of mitigation on their private land; therefore, there is a potential loss of forage associated with the riparian areas on private land.** Ongoing monitoring included in the mitigation measures would ensure that adequate water supplies are maintained and available for livestock.

3.12.3.6.1 Residual Adverse Impacts

The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the unavoidable permanent loss of **32 AUMs from the development of the open pit and the loss of 781 AUMs for approximately 70 years from allotments within the fenced Project Area.**

3.12.3.7 Slower, Longer Project Alternative

Impacts under the Slower, Longer Project Alternative would be of the same type as the impacts under the Proposed Action, but would last for approximately 115 years.

The number of AUMs lost would be the same as the Proposed Action. However, the potential for resumption of livestock grazing within the fenced Project Area would be prolonged (115 years compared to 70 years). **Based on the longer Project duration, the economic impact to livestock grazing as a result of this alternative would be approximately $1,876,743 more than the impact under the Proposed Action.**

The 14,204-acre exclosure would not impact AUMs within the 3 Bars, Santa Fe/Ferguson, or Lucky C Allotments but could potentially impact AUMs due to possible impacts to forage and habitat related to water level drawdown.

- **Impact 3.12.3.7-1:** Project development and operation under the Slower, Longer Project Alternative would result in **permanent loss of 32 AUMs and** the loss of 781 AUMs **for approximately 115 years** from allotments within the Project Area.

  Significance of the Impact: The impact is considered potentially significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures. Also see Section 3.26 for suggested mitigation outside of the BLM's jurisdiction.

Impacts to forage productivity as a result of the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table under the Slower, Longer Project Alternative would be similar to those impacts described for the Proposed Action, but of a longer duration.

- **Impact 3.12.3.7-2: Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Although the lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities, it is possible that the changes in phreatophyte community would result in a loss of forage productivity. Impacts to other vegetation communities as a result of drawdown are not expected.**

  Significance of the Impact: The impact is considered potentially significant. The following mitigation has been identified for this impact.

- **Mitigation Measure 3.12.3.7-2: The BLM would monitor for changes to forage productivity as a result of ground water drawdown associated with Project-related ground water pumping. If the BLM detects a loss of forage productivity attributed to the Project, the BLM would develop and provide EML with a list of appropriate seed mixes for those areas within and outside the Project Area impacted by water table drawdown that should be seeded. The nature of the seed mix may vary depending on the conditions encountered as a result of the drawdown. If the BLM determines reseeding to be necessary, the BLM would coordinate the conditions for reseeding (including a possible two-year grazing closure) with local permittees in order to reduce impacts to AUMs. Mitigation for the potential loss of water available for livestock from stock water rights and other surface waters are described in the Water Resources - Water Quantity impacts discussion (Mitigation Measures 3.2.3.3-2 and 3.2.3.3-3). Mitigation for loss of water available would also mitigate the loss of vegetation (livestock forage).**

- **Effectiveness of Mitigation and Residual Effects: Mitigation measure 3.12.3.7-2 would reduce potential impacts to local permittees from changes in vegetation species composition and percent cover as a result of water table drawdown during Project activities. Monitoring vegetation and possible reseeding with an appropriate seed mix, as well as BLM coordination with local permittees following reseeding, would reduce the long-term impacts to AUMs, although short-term impacts may occur while any reseeding effort is implemented. If a two year suspension is**

required, impacts would persist until the suspension is lifted, in an amount proportionate to the amount of AUMs temporarily suspended.

The majority of disturbed lands within the 14,204-acre exclosure would be reclaimed and available for future grazing. Successful revegetation of disturbed lands would increase plant cover and provide an adequate amount of forage to recover the majority of AUMs lost during the Project. Once vegetation has been successfully re-established (BLM/NDEP standards), the BLM would evaluate livestock resumption within the Project Area.

The open pit would result in the permanent loss of approximately 734 acres (644 within the Romano Allotment and 90 acres within the Roberts Mountain Allotment).

As discussed in the Proposed Action, 18 existing stock water rights occurring within the ten-foot drawdown area may experience negative impacts including a reduction in available water or complete water loss as a result of ground water drawdown associated with the Slower, Longer Project Alternative. Livestock require water year long to satisfy physiological requirements. The reduction or loss of existing water sources could impact livestock in the Project Area. A reduction in surface water would affect the amount of foraging habitat for livestock.

- **Impact 3.12.3.7-3:** Livestock dependent on existing water sources in the Project Area would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table could result in reduced water available for use in rangeland management.

  Significance of the Impact: The impact could be potentially significant. **The following** mitigation **has been identified for this impact**.

- **Mitigation Measure 3.12.3.7-3:** Mitigation for the potential loss of water availab**ility** for livestock from stock water rights and other surface waters is described in the Water Resources - Water Quantity impacts discussion (Mitigation Measures 3.2.3.3-2 and 3.2.3.3-3). **Implementation of any of the specific mitigation outlined in these measures for springs located on private land would be subject to the authorization of the private land owner. Mitigation for loss of water available would also mitigate the loss of vegetation (livestock forage). Additionally, where livestock and wild horse use overlap those mitigation measures identified for wild horses (Mitigation Measure 3.13.3.3-1) would also benefit livestock.**

- **Effectiveness of Mitigation and Residual Effects:** Implementation of Mitigation Measures in Section 3.2.3 would effectively mitigate any reductions in water available for use in rangeland management**), with the exception of impacts to forage on private land associated with riparian areas. The BLM cannot require a private land owner to consent to the implementation of mitigation on their private land; therefore, there is a potential loss of forage associated with the riparian areas on private land**. Ongoing monitoring included in the mitigation measures would ensure that adequate water supplies are maintained and available for livestock.

No impacts to existing range improvements **other than developed spring sites and removal of existing fencing within the Project fence** are anticipated.

The probable risk to livestock from the pit lake created under the Slower, Longer Project Alternative is the same as for the Proposed Action and would be low.

3.12.3.7.1 Residual Adverse Impacts

The Slower, Longer Project Alternative would result in the unavoidable permanent loss of **32 AUMs from the development of the open pit.**

3.13 Wild Horses

3.13.1 Regulatory Framework

Under the FLPMA, wild horses and burros are one of the multiple uses that the BLM must manage in combination to best meet the public's present and future needs. The FLPMA included the approval for the use of helicopters for gathers and required that a current inventory of wild horses and burros be maintained. The Public Rangelands Improvement Act of 1978 defined excess horses, mandated research, and provided guidance for titles of adopted horses and the adoption process.

3.13.1.1 Wild Free-Roaming Horses and Burros Act

The Wild Free-Roaming Horses and Burros Act of 1971 (WFRHBA) (Public Law 92-195) protects wild free-roaming horses and burros from capture, branding, harassment, or death. This Act also defines the ecological and multiple-use role of the management of wild horses and burros on federal lands and their historical and cultural value. The Act applies to all unbranded and unclaimed horses and burros on public lands administered by the BLM (43 CFR 4700) (BLM 2000). In accordance with the WFRHBA, wild horses are to be managed so as to maintain a thriving natural ecological balance on the range, and protect the range from the deterioration associated with overpopulation.

Herd Management Areas (HMAs) are identified in Land Use Planning for long-term management of wild horses and are designated "Special Management Areas" on public lands. The BLM maintains and manages wild horses **and burros** in HMAs and in Nevada wild horses and burros are found in approximately 100 HMAs, totaling approximately 15,249,265 acres (BLM 2011**a**). Establishment of HMAs must take into consideration the Appropriate Management Level (AML) for the herd, the habitat requirements of the animals, and the relationships with other uses of public land. The objective of the management of wild horses and burros is to limit the animals' distribution to the Herd Areas (HAs), which are limited to areas of public lands identified as being habitat used by wild horses and burros at the time of the passage of the WFRHBA (43 CFR 47000-5(d)). A herd is defined as one or more stallions and his mares. Management strategies include monitoring, inventory, and removal of excess wild horses or burros through periodic gathers, with an emphasis to limit management activities to the minimal feasible level (BLM 2000).

Wild horse and burro herds increase at relatively high rates because they **have virtually no** natural predators (BLM 2000). The majority of wild horse foals are born between March 1 and July 1, annually. Throughout the HMAs, populations increase by ten to 22 percent annually. AMLs have been established by the BLM's MLFO. According to the WFRHBA, when population inventory, monitoring data, and other data indicate that an over population of wild

horses exists, a gather would be planned to remove excess wild horses and achieve the AML. Other population controls such as fertility control may also be implemented to slow population growth rates and maintain a thriving natural ecological balance on the range and protect the range from the deterioration associated with overpopulation. The BLM prepares the horses and burros for adoption through permanent adoption centers. The BLM is also guided by the Nevada Northeastern Great Basin Resource Advisory Council to promote healthy rangelands through implementation of standards and guidelines for maintaining healthy wild horse and burro herds on HMAs.

3.13.2 Affected Environment

3.13.2.1 Study Methods

This section includes a discussion of wild horse movement, gathers, and existing HMAs within the Project Area. The predicted ten-foot ground water drawdown would also impact the Fish Creek HMA and Kobeh Valley HA. The Roberts Mountain, Whistler Mountain, and Fish Creek HMAs and Kobeh Valley HA are managed jointly by the BLM as a Wild Horse Complex.

3.13.2.2 Existing Conditions

The Project is located within the Roberts Mountain and Whistler Mountain HMAs.

Roberts Mountain HMA

The Roberts Mountain HMA is located 30 miles northwest of Eureka, Nevada, in Eureka County west of SR 278. The HMA consists of 99,990 acres and is 17 miles long by ten miles wide. The HMA shares the eastern boundary with the Whistler Mountain HMA.

The AML for the Roberts Mountain HMA is 150 wild horses. **The 2012 post-foaling population is 273.** Many of the horses in the Roberts Mountain HMA are distributed into the lower elevations of Kobeh Valley during both summer and winter. Several water sources appear to be key in influencing movement patterns. Figures 3.2.2 and 3.2.3 identify known surface water sources available to wild horses within and adjacent to the HMA. Wild horses also move back and forth into the Whistler Mountain HMA and outside of HMA boundaries into the Kobeh Valley HA and the northern portion of the Fish Creek HMA.

Wild horses travel throughout the Roberts Mountain HMA with few impediments to the movement. There are several pasture fences and drift fences throughout the two allotments included within the HMA, but the horses know where the fences are located and travel through open gates and around drift fences. During summer months, horses may move into the higher elevations and foothills that support piñon-juniper and contain springs and ponds. A primary water source used by horses in summer is Mud Springs, a water filled depression that holds water until late summer. During winter months, wild horses often move down to the lower elevations in the southern portion of the HMA as snow accumulates in the mountains. During the winter months, wild horses from the Roberts Mountain HMA have been documented moving south out of the HMA into the northwest portion of Kobeh Valley and joining with wild horses from the Whistler Mountain and Fish Creek HMAs.

The wild horses within the Roberts Mountain HMA are known to be moderate to large in size with good to excellent confirmation. Colors include many buckskins, palominos, roans, and duns in addition to the typical colors of bay, brown, and black (Personal Communication, Shawna Richardson, BLM Wild Horse Specialist, March 20, 2007). Genetic variability of this herd is high and this is likely due to both the past large population size and mixing with other herds. Genetic similarity results suggest a herd with mixed ancestry that is primarily North American which is consistent with the appearance of the horses.

A total of approximately 12,114 acres of the Project is located within the Roberts Mountain HMA. **Approximately 19 percent of the Project Area (excluding the portion of the HMA that occurs within the fenced portion of the Project Area) is located within this HMA.**

Whistler Mountain HMA

The Whistler Mountain HMA is located ten miles northwest of Eureka, Nevada, in Eureka County. The eastern boundary of the Whistler Mountain HMA lies along SR 278. The Whistler Mountain HMA consists of 43,247 acres and is 16 miles long and seven miles wide. The Whistler Mountain HMA shares its western boundary with the Roberts Mountain HMA and wild horses frequently move between the two HMAs. Additionally, no fence exists on the western boundary of the Whistler Mountain HMA in Kobeh Valley, allowing wild horse movement into the valley.

The AML for the Whistler Mountain HMA has been set for 14 to 24 wild horses. **The 2012 population** The AML for the Whistler Mountain HMA was developed with consideration of the movement patterns of the wild horses to ensure that their year round needs are met, and that over-utilization of the vegetation does not occur. The AML was also set at a level to ensure that wild horses are successful in drought years when forage and water may be limited.

The wild horses using the Whistler Mountain HMA and the Kobeh Valley area are strongly associated with the Roberts Mountain HMA. Fencelines separate the Roberts Mountain, Romano, and Lucky C Allotments; however, wild horses have found places to cross the fence by taking advantage of open gates and travel back and forth between the areas. Throughout the year, wild horses move back and forth into the Roberts Mountain HMA, as a result of changes in water supply, presence of livestock, and changes in forage condition and climate. In summer months, it is likely that the wild horses from the Whistler Mountain HMA move west into the Roberts Mountain HMA to access water sources and cooler, higher elevations. Figures 3.2.2 and 3.2.3 identify known surface water sources available to wild horses within and adjacent to the HMA.

In recent years, many wild horses have been observed in the Mount Hope vicinity especially in the spring; however, there may be a number of year-round wild horse residents in certain years. As many as 80 wild horses were estimated to be using the Mount Hope area in the spring of 2001. As many as 76 wild horses were observed both inside and outside of the Whistler Mountain HMA in 1994. During a 1992 population inventory flight, 87 wild horses were observed in the Romano Allotment portion of the Whistler Mountain HMA. Numbers observed in population inventory flights since that time have been low, with the exception of 1998 when 44 wild horses were observed. The population levels and distribution of the horses are also influenced by the Roberts Mountain HMA, which was gathered in 1987, 1995, 2001, and 2008.

A total of approximately 8,**943** acres of the Project are located within the Whistler Mountain HMA. **Approximately 12 percent of the Project Area (excluding the portion of the HMA that occurs within the fenced portion of the Project Area) is located within this HMA.**

Fish Creek HMA

The Fish Creek HMA is located a few miles south of Eureka, Nevada, in the Antelope and Little Smoky Valleys and in the Antelope and Fish Creek Mountains. The area is approximately 252,739 acres in size and is 25 miles wide and 28 miles long. However, a small portion of the HMA exists north of U.S. Highway 50, which is separated by highway ROW fences. This portion of the HMA is only 19,300 acres and is managed with the Whistler Mountain and Roberts Mountain HMAs.

The AML for the Fish Creek HMA was established through the **Final Multiple Use Decision** (FMUD) issued by the MLFO September 27, 2004, following the analysis of monitoring data and completion of the Fish Creek Complex Evaluation and Rangeland Health Assessment and Environmental Assessment (EA) #NV062-EA04-69. The total AML for the HMA was established as a range of 107 to 180 wild horses year round.

The portion of the Fish Creek HMA north of U.S. Highway 50 is located within the Kobeh Valley HA and neither the HMA nor the HA are extensively utilized by wild horses. Little water exists within HMA boundaries, and as a result, wild horses do not remain inside the HMA but move throughout Kobeh Valley and drift into the Whistler and Roberts Mountain HMAs. Figures 3.2.2 and 3.2.3 identify known surface water sources available to wild horses within and adjacent to the HMA. Due to lack of available water, a group of wild horses had to be removed from Kobeh Valley in 2001, in an emergency gather. There are no fences dividing the Fish Creek HMA from the Whistler Mountain HMA in Lucky C Allotment (northern portion). The AML for the northern portion of the Fish Creek HMA was established at six to ten wild horses, to account for the incidental use of wild horses in the area, and the lack of perennial water.

A total of approximately **333** acres of the Project are located within the Fish Creek HMA. **Approximately 1.5 percent of the Project Area (excluding the portion of the HMA that occurs within the fenced portion of the Project Area) is located within this HMA.**

Gather History

Four gathers have been completed within the Roberts Mountain HMA in 1987, 1995, 2001, and 2008. One gather was conducted between August 11 and 13, 1987, in which 120 wild horses were removed from within and outside of the HMA boundaries. The entire HMA was not gathered at that time, and the wild horses in the remainder of the HMA were left undisturbed.
The Roberts Mountain HMA was gathered between October 10 and 18, 1995. During this gather, a total of 344 wild horses were captured, and 170 were shipped to the Palomino Valley Center, on Pyramid Lake Highway approximately 20 miles north of Sparks, Nevada.

A total of 580 wild horses were captured in a gather conducted between July 13 and 23, 2001. At the end of the gather, 131 mares, foals and studs were released back to the HMA. During the 2001 wild horse gather on the Roberts Mountain HMA, 28 wild horses were removed from the Lucky C Allotment/Whistler HMA due to the lack of sufficient water (i.e., drought emergency). At the time, it was also estimated that between 60 and 80 wild horses may have moved into

Roberts Mountain HMA from the adjacent Whistler Mountain HMA and were gathered as part of the operation.

The most recent gather was completed between January 17 and 23, 2008. A total of 373 wild horses were captured in total from the Roberts Mountain HMA and Whistler Mountain HMA, with 25 mares and studs returned to the range. Most horses observed were very thin or emaciated due to limited forage and water available due to drought, compounded by deep snow throughout Kobeh Valley; only the healthiest horses were returned to the range.

Prior to 2008, no formal gathers of wild horses had been conducted within the Whistler Mountain HMA by the BLM. The population size of wild horses within the Whistler Mountain HMA is a product of gathers in adjacent areas. In 2001, 28 drought stressed horses were removed from the Whistler Mountain HMA in conjunction with the Roberts Mountain gather. The Kobeh Valley area outside the Fish Creek HMA was also gathered in 1994 at which time 129 horses were captured and 27 horses over the age of ten were released due to the selective removal policy. Gathers of the Kobeh Valley outside the Fish Creek HMA were also completed in 2008. In 2008, 30 wild horses were gathered and removed from the area.

Eleven groups of wild horses totaling 43 adults and nine foals were located during a population inventory in September 2008 in the area proposed to be fenced during the Project. The total 2011 wild horse population of the Roberts Mountain Complex, which includes Roberts Mountain, Whistler Mountain, and North Fish Creek HMAs and the Kobeh Valley HA is estimated to be 307. Population estimates for these HMAs are based on the average annual rate of increase in the HMAs of 17.5 percent.

3.13.3 Environmental Consequences and Mitigation Measures

3.13.3.1 Significance Criteria

Impacts to wild horses and burros would be considered significant if the Proposed Action or alternatives resulted in any of the following:

- Loss of acres, available forage, or water that results in substantial negative effects to the long-term health (including genetic variability) of the wild horses within the Roberts Mountain Complex; or
- Enhancement of, or interference, with the normal distribution and movement patterns of wild horses and burros within an HMA.

3.13.3.2 Assessment Methodology

The environmental consequences to wild horses in the Project Area were evaluated using available Project information. Potential impacts to the HMAs and wild horses were analyzed based on the current wild horse estimates in each of the areas, as well as the number of acres potentially affected by the Proposed Action.

In this environmental consequences discussion the Fish Creek HMA is not considered because 1) there are very few, if any, wild horses in the northern part of the Fish Creek HMA, 2) the northern end of the HMA was cut off by the U.S. Highway 50 fence, 3) there is very little water

on the northern end of the HMA, and 4) there is no direct effect of the Proposed Action to this HMA.

3.13.3.3 Proposed Action

3.13.3.3.1 Loss of Habitat, Available Forage, or Water

Approximately 14,204 acres of wild horse habitat would be directly removed as a result of the fence. Within the fenced area, approximately 13,998 acres are designated as one of two HMAs (Roberts Mountain HMA and Whistler Mountain HMA). A total of approximately 12,**113.7** acres of the Project are located within the Roberts Mountain HMA, and approximately 7,836 acres would be excluded within this HMA as a result of the construction of the Project-boundary fence. A total of approximately 8,**943** acres of the Project are located within the Whistler Mountain HMA, and approximately 6,162 acres would be excluded within this HMA as a result of the construction of the Project-boundary fence.

Project-related surface disturbance could also result in limiting wild horse access to developed and natural water sources located in the Project Area, and direct impacts could occur as a result of vehicular collisions along access roads. Section 3.2.3.3.1 discusses the specific affects to surface water resources.

Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities. Additionally, reseeding mitigation proposed in Section 3.**12**.3 would **improve** the availability of forage for wild horses in areas identified by the BLM. Impacts to other vegetation communities as a result of drawdown are not expected. Therefore, impacts to overall wild horse forage as a result of the drawdown are not expected.

- **Impact 3.13.3.3-1:** Approximately 14,204 acres of wild horse habitat would be directly removed as a result of the fence**. Approximately 232** acres of wild horse habitat **in the Project Area** would be potentially affected over the 44-year mine life and subsequent reclamation outside of the fenced portion of the Project**, excluding approximately 124 acres associated with the powerline portion of the Project Area and 50 acres associated with exploration. The location of the 50 acres of surface disturbance associated with exploration cannot be determined at this time. The location of the 124 acres of surface disturbance associated with the powerline would occur with the powerline portion of the Project Area; however, the exact location of this disturbance has not been specified yet. The exact number of acres of surface disturbance for these two Project features within each HMA cannot be calculated at this time.** Impacts to wild horses would also include a loss of access to water within the fenced portion of the Project Area. Impacts to wild horses could last approximately 70 years.

  Significance of the Impact: The impact is considered significant for wild horse access to water.

- **Mitigation Measure 3.13.3.3-1:** Specific mitigation for surface water resources identified as being impacted by the Project is listed in Table 3.2-9. In order to further mitigate the loss of habitat and water sources to wild horses through the Project Area, EML would provide alternative water sources for wild horses. Six locations within the Whistler Mountain and Roberts Mountain HMAs have been identified in coordination with the BLM and would be developed as water sources for horses and could also be used by wildlife and livestock in areas historically used by wild horses (Figure 3.13.1). These sites consist of existing stock wells that are not currently functioning or do not have pumps or troughs and two new sources tapped from Project production wells. These sources would provide water where it has not been available previously or where availability has been limited. These sources would replace water sources located within the Project boundary fence that would no longer be available to wild horses. Distribution of wild horse use would also be improved. The Project's Mitigation Plan is included in this EIS as Appendix **D**.

  The development of these six sites is detailed in Appendix **D, Attachment 2**. Appendix **D, Attachment 2** includes a description of how each site would be developed. The sites would be owned and operated by EML. Operations would include periodic inspections and maintenance, turning water on and off, and winterizing water sources as determined through coordination with the BLM. Upon Project completion, improvements associated with the stock watering wells and spring would remain in place for the continued support of wild horses, wildlife, and livestock within the HMAs and grazing allotments. EML would implement the mitigation plan in Appendix **D, Attachment 2**. Should EML decide not to retain ownership of the associated water rights, agreements would be reached at that time between EML, and those associated with the current grazing privileges on the specific allotment(s), NDOW, and BLM to transfer ownership of these improvements to the appropriate parties.

  The selection of new or replacement troughs and tanks would be based on design to reduce evaporation in the summer and reduce freezing in the winter. All pipelines from wellheads to the Project fenceline under this mitigation would be buried below the ground to avoid limiting wild horse movement.

  If Project activities caused a water source to become unavailable to wild horses, the Authorized Officer could require a new well to be drilled or another water development to be constructed in the general area to provide adequate water for the wild horses. Should monitoring indicate that wild horses were being negatively impacted by the mining activities, the Mount Lewis Field Manager could require additional measures for the protection of wild horses such as seasonal restrictions during the peak foaling period. Mitigation could include annual, biennial, or quarterly helicopter population inventory flights of the area in addition to on the ground monitoring by BLM and Project personnel. However, the use of a helicopter below 500 feet would not occur between March 1 and June 30 in order to prevent disruption during foaling period, causing orphaned or abandoned foals.

  Fences constructed around the Project Area would use white-topped steel posts. Additional reflectors may be necessary if problems with horses impacting fences occur. Fences should be continuous with no breaks (no drift fences). Horses climb steep or rocky terrain and may go around the ends of fences.

Should horses be discovered within the fenced areas, Project personnel would contact the BLM immediately to assist with the removal of the horses. Wild horses could be fence-wise and difficult to push through gates or fence openings. This often results in horses attempting to jump fences and becoming cut by barbed wire. BLM staff have materials to assist in the removal of wild horses. Project personnel would not "haze" wild horses out of fenced areas.

EML would avoid the BLM's Key Management Areas for vegetation monitoring established near Mount Hope and in Kobeh Valley.

Additional mitigation for livestock grazing and production is summarized in Appendix **D**.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of Mitigation Measure 3.13.3.3-1 would be effective to reduce any impacts to the loss of habitat or resources within the HMA to less than significant. The Mitigation Plan would also ensure the effectiveness of this mitigation measure (Appendix **D**).

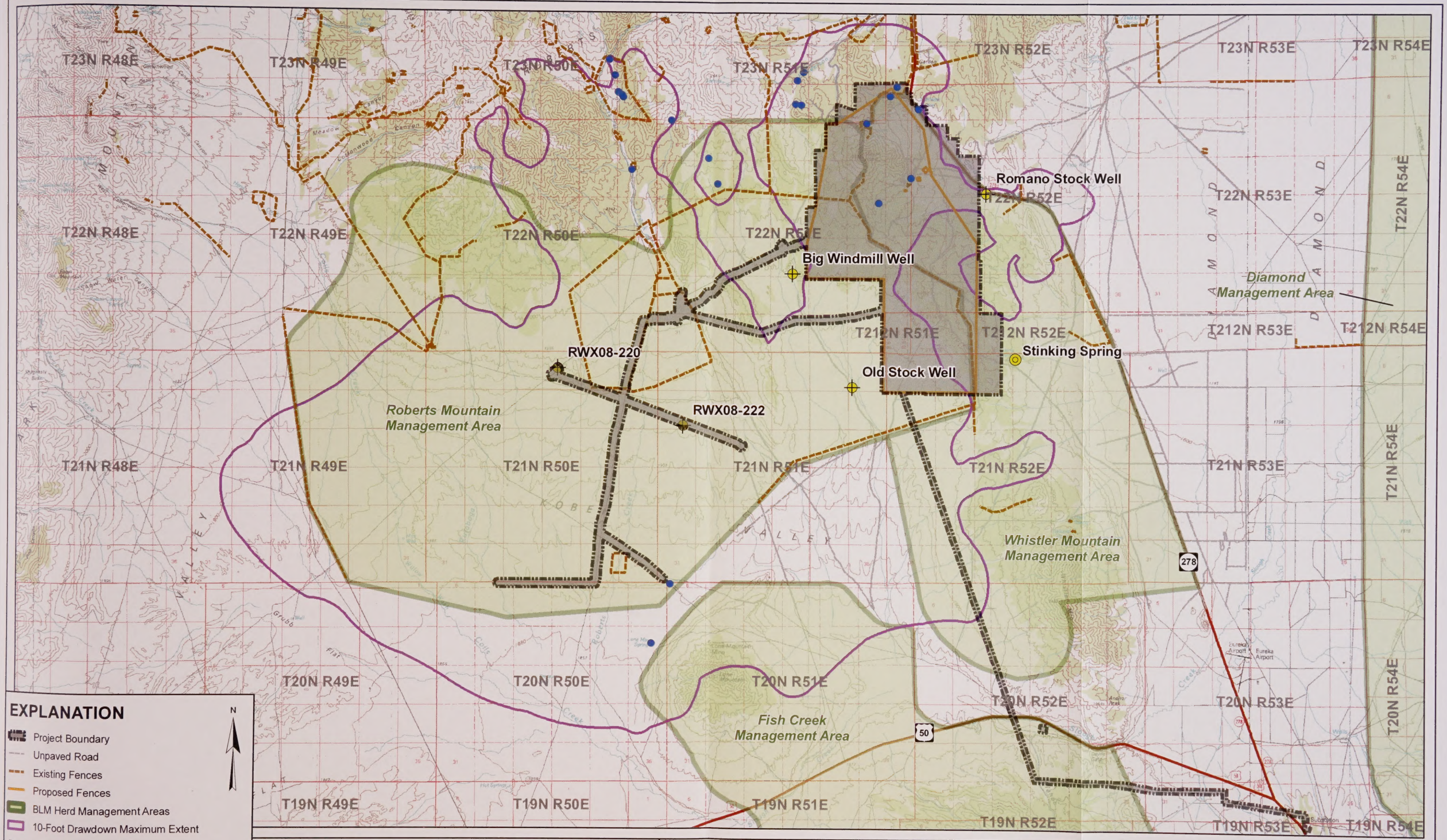
3.13.3.3.2 Impacts to the Normal Distribution and Movement Patterns of Wild Horses

Project-related activities could result in direct impacts to the movement patterns of wild horses. In order to minimize direct impacts to wild horses (i.e., wild horse-machinery collisions), a perimeter fence enclosing 14,204 acres would be constructed during Project activities in the general area, which includes the open pit, WRDFs, and TSFs. The construction of this fence would exclude wild horses during mine operation and reclamation for approximately 70 years. As described in the Proposed Action, the fence would be monitored on a regular basis and repairs made as needed. EML would assist, as requested, in moving these animals out of the Project Area. Construction of the fence would result in the movement of wild horses to other parts of the HMA potentially increasing the use of forage and water resources that may be already limited.

In addition, noise disturbance, human presence, and increased vehicular traffic would be continuous for approximately 44 years during implementation of the Proposed Action. Sudden loud noises such as blasts could cause wild horses to disperse in directions away from the sound. This behavior could send wild horses into unfamiliar terrain. Some wild horses may avoid the area while others may tolerate the noise and continue foraging and breeding activities in the vicinity of the Project Area.

Distribution changes could result in concentrations of wild horses using vegetation resources in certain areas and increased utilization levels. For example, increased human disturbance and unavailable land in the Whistler Mountain HMA and east portion of the Roberts Mountain HMA could result in the population shifting to the west portion of the Roberts Mountain HMA, resulting in larger numbers of wild horses using smaller land areas. As a result, upland forage species could be heavily utilized. Distribution changes could also result in reduced viewing opportunities by the public. Some impacts could occur to wild horses during the peak foaling season if widespread human activity disturbs the population. As a result, new foals could be orphaned or abandoned.

Potential impacts to the normal distribution and movement patterns of wild horses and burros are temporary in nature, and would not result in permanent displacement. Horses and some wildlife



EXPLANATION

- Project Boundary
- Unpaved Road
- Existing Fences
- Proposed Fences
- BLM Herd Management Areas
- 10-Foot Drawdown Maximum Extent

Potential Water Sources

- Well Water Source
- Spring or Seep Water Source
- Other Springs

N

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0 1 2 3 4 5 6 7 Miles

IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD
CHECKED: -	APPROVED: RFD	DATE: 07/31/2012
FILE NAME: p1635_Fig3-13-1_WildHorseManagement.mxd		

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Wild Horse Management Areas and Water Development Areas

Figure 3.13.1

species have shown the ability to adapt to the noise created by mines, road traffic, pumps, and even blasting.

- **Impact 3.13.3.3-2:** Project-related activities, such as the addition of a fence to the Project Area or noise from human presence, blasting, vehicular traffic, or other sources, associated with the Proposed Action could result in wild horse displacement and changes in wild horse use throughout the HMA for the 44-year Project life.

  Significance of the Impact: The mitigation outlined above and in Appendix **D, Attachment 2** would reduce the potential impacts to the distribution of wild horses. This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.13.3.3.3 Residual Adverse Impacts

The Proposed Action would result in the unavoidable loss of 734 acres of wild horse foraging habitat resulting from surface disturbance in the open pit area. Approximately 14,204 acres of foraging habitat would be removed in the short term. The reclaimed land would have more grass and forb forage and less mature shrub forage in the short term.

The evaluation of the potential effects of the pit lake on wild horses used a SLERA. The general approach used in the preparation of the SLERA is similar to that developed by the Environmental Sciences Division and Life Sciences Division of Oak Ridge National Laboratory for the U.S. Department of Energy. In addition, the SLERA incorporated more recent TRVs for certain inorganic chemical constituents derived by the EPA (SRK 2009). Together, these were used to develop species-specific toxicity criteria to which the predicted constituents in the pit water were compared.

Protective criteria for the surrogate species are likely to be protective of local species occupying similar ecological niches at the Project Area. Additionally, it was assumed that the wildlife receptors would consume water from the pit lake; and, that this water would constitute 100 percent of each species individual daily water requirements (i.e., no outside sources of water would be utilized over the life of the animal). This is considered an extremely conservative assumption.

The results of the assessment indicate that the most likely predicted water quality of the modeled future pit lake water at the Project Area could represent a low to moderate toxicological threat to wild horses based on Nevada's beneficial use standard for livestock watering. However, since this water is not intended to be a livestock watering source **and livestock access would be restricted by the construction of the pit perimeter berm**, and the standards were based on limited toxicological information, the probable risk to wild horses from the pit lake under the Proposed Action would be low since wild horses could not access the pit lake.

3.13.3.4 No Action Alternative

Under the No Action Alternative, the proposed Project would not be developed and associated impacts to wild horses would not occur. EML would continue existing activities under

previously authorized Notices, and the area would remain available for future mineral development or for other purposes as approved by the BLM.

3.13.3.4.1 Residual Adverse Impacts

There would be no residual adverse impacts to wild horses under the No Action Alternative.

3.13.3.5 Partial Backfill Alternative

Impacts to wild horses would be similar to those described for the Proposed Action, however, the Partial Backfill Alternative would involve the partial backfilling of the open pit to eliminate the pit lake and the floor of the open pit would be reclaimed with growth media and seeded. Although the Proposed Action would have 734 acres that would remain unvegetated in the open pit, under this alternative approximately 527 acres would remain unvegetated following Project completion and reclamation; therefore, impacts to wild horses would be similar to, but less than, those described for the Proposed Action.

- **Impact 3.13.3.5-1:** Approximately 14,204 acres of wild horse habitat would be directly removed as a result of the fence. **Approximately 232** acres of wild horse habitat **in the Project Area** would be potentially affected over the 44-year mine life and subsequent reclamation **outside of the fenced portion of the Project, excluding approximately 124 acres associated with the powerline portion of the Project Area and 50 acres associated with exploration. The location of the 50 acres of surface disturbance associated with exploration cannot be determined at this time. The location of the 124 acres of surface disturbance associated with the powerline would occur with the powerline portion of the Project Area; however, the exact location of this disturbance has not been specified yet. The exact number of acres of surface disturbance for these two Project features within each HMA cannot be calculated at this time**. Impacts to wild horses would also include a loss of access to water within the fenced portion of the Project Area.

  Significance of the Impact: The impact is considered significant for wild horse access to water.

- **Mitigation Measure 3.13.3.5-1:** Mitigation under the Partial Backfill Alternative would be the same as mitigation under the Proposed Action.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of Mitigation Measure 3.13.3.5-1 would reduce any impacts to the loss of acreage or resources within the HMA to less than significant.

- **Impact 3.13.3.5-2:** Project-related activities, such as the addition of a fence to the Project Area or noise from blasting or other sources, associated with the Partial Backfill Alternative could result in wild horse displacement and changes in wild horse use throughout the HMA for the life of the Project.

  Significance of the Impact: The mitigation outlined above and in Appendix **D, Attachment 2** would reduce the potential impacts to the distribution of wild horses.

Impacts from the Partial Backfill Alternative would be the same as impacts from the Proposed Action.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.13.3.5.1 Residual Adverse Impacts

The Partial Backfill Alternative would result in the unavoidable loss of 527 acres of wild horse foraging habitat resulting from surface disturbance in the open pit area. Approximately 14,204 acres of foraging habitat would be removed in the short term. The reclaimed land would have more grass and forb forage and less mature shrub forage in the short term.

3.13.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Although the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in approximately 20 acres less surface disturbance compared to the Proposed Action, impacts to wild horses from this alternative would be similar to those for the Proposed Action since the acreage would decrease by only 0.2 percent.

- **Impact 3.13.3.6-1:** Approximately 14,204 acres of wild horse habitat would be directly removed **as a result of the fence. Approximately 232** acres of wild horse habitat **in the Project Area** would be potentially affected over the 44-year mine life and subsequent reclamation **outside of the fenced portion of the Project, excluding approximately 124 acres associated with the powerline portion of the Project Area and 50 acres associated with exploration. The location of the 50 acres of surface disturbance associated with exploration cannot be determined at this time. The location of the 124 acres of surface disturbance associated with the powerline would occur with the powerline portion of the Project Area; however, the exact location of this disturbance has not been specified yet. The exact number of acres of surface disturbance for these two Project features within each HMA cannot be calculated at this time**. Impacts to wild horses would also include a loss of access to water within the fenced portion of the Project Area.

  Significance of the Impact: The impact is considered significant for wild horse access to water.

- **Mitigation Measure 3.13.3.6-1:** Mitigation under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be the same as mitigation under the Proposed Action.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of Mitigation Measure 3.13.3.6-1 would reduce any impacts to the loss of acreage or resources within the HMA to less than significant. The Mitigation Plan would also ensure the effectiveness of this mitigation measure (Appendix **D, Attachment 2**).

- **Impact 3.13.3.6-2:** Project-related activities, such as the addition of a fence to the Project Area or noise from human presence, blasting, vehicular traffic, or other sources,

associated with the Proposed Action could result in wild horse displacement and changes in wild horse use throughout the HMA for the life of the Project.

Significance of the Impact: Impacts from the Partial Backfill Alternative would be the same as impacts from the Proposed Action. The mitigation outlined above and in Appendix **D, Attachment 2** would reduce the potential impacts to the distribution of wild horses.

3.13.3.6.1 Residual Adverse Impacts

The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the unavoidable loss of 734 acres of wild horse foraging habitat resulting from surface disturbance in the open pit area. Approximately 14,204 acres of foraging habitat would be removed in the short term. The reclaimed land would have more grass and forb forage and less mature shrub forage in the short term. Impacts of the pit lake water toxicity to wild horses would be the same as the Proposed Action.

3.13.3.7 Slower, Longer Project Alternative

Impacts to wild horses from the Slower, Longer Project Alternative are expected to be similar to impacts from the Proposed Action at the end of the Project; however, impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action.

- **Impact 3.13.3.7-1:** Approximately 14,204 acres of wild horse habitat would be directly removed as a result of the fence. **Approximately 232** acres of wild horse habitat **in the Project Area** would be potentially affected over the extended mine life and subsequent reclamation **outside of the fenced portion of the Project, excluding approximately 124 acres associated with the powerline portion of the Project Area and 50 acres associated with exploration. The location of the 50 acres of surface disturbance associated with exploration cannot be determined at this time. The location of the 124 acres of surface disturbance associated with the powerline would occur with the powerline portion of the Project Area; however, the exact location of this disturbance has not been specified yet. The exact number of acres of surface disturbance for these two Project features within each HMA cannot be calculated at this time. Impacts to wild horses would also include a loss of access to water within the fenced portion of the Project Area. Impacts to wild horses could last approximately twice as long as the Proposed Action**.

  Significance of the Impact: The impact is considered significant for wild horse access to water.

- **Mitigation Measure 3.13.3.7-1:** Specific mitigation for surface water resources that has been identified as being impacted by the Project is listed in Tables 3.2-9 and 3.2-18. Otherwise, the mitigation under the Slower, Longer Project Alternative would be the same as mitigation under the Proposed Action.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of Mitigation Measure 3.13.3.7-1 would reduce any impacts to the loss of acreage or resources within

the HMA to less than significant. The Mitigation Plan would also ensure the effectiveness of this mitigation measure (Appendix **D, Attachment 2**).

- **Impact 3.13.3.7-2:** Project-related activities, such as the addition of a fence to the Project Area or noise from blasting or other sources, associated with the Slower, Longer Project Alternative could result in wild horse displacement and changes in wild horse use throughout the HMA for the duration of the Project, which would be twice as long as the Proposed Action.

  Significance of the Impact: Impacts from the Slower, Longer Project Alternative would be the same as impacts from the Proposed Action. The mitigation outlined above and in Appendix **D, Attachment 2** would reduce the potential impacts to the distribution of wild horses.

3.13.3.7.1 Residual Adverse Impacts

The Slower, Longer Project Alternative would result in the unavoidable loss of 734 acres of wild horse foraging habitat resulting from surface disturbance in the open pit area. Approximately 14,204 acres of foraging habitat would be removed during Project activities. The reclaimed land would have more grass and forb forage and less mature shrub forage.

3.14 Land Use

3.14.1 Regulatory Framework

The NEPA requires the consideration of local plans and policies in the assessment of the social and environmental effects of proposals involving federal lands. Federal, state, and local plans and guidelines that apply to land use authorizations and access within the study area include the following: Shoshone-Eureka RMP; 2010 Eureka County Master Plan, including the updated Natural Resources and Federal or State Land Use (Natural Resource and Land Use Plan) and Economic Development elements; and the Land and Resource Management Plan for the Toiyabe National Forest.

The Shoshone-Eureka RMP serves as the guiding policy document for BLM administered lands surrounding the Project Area. The ROD included the following objective relevant to the Proposed Action:

> Assure that mineral exploration, development and extraction are carried out in such a way as to minimize environmental and other resource damage and to provide, where legally possible, for the rehabilitation of lands.

The ROD also included the following Management Decision under Locatable Minerals:

> All public lands in the planning areas would be open for mining and prospecting unless withdrawn or restricted from mineral entry.

The Growth Management, Public Facilities and Services and Economic Development elements of the 2010 Eureka County Master Plan outline goals that pertain to the Project and include the following:

- Encourage new development in Eureka County in a planned and orderly manner consistent with maintenance of existing quality of life, environmental attributes, and fiscal resource limits of the County;
- Encourage new development to areas in or proximate to existing communities where public infrastructure can be efficiently provided and a sense of community can be established or improved;
- Provide for the organized planning, funding, construction, and maintenance of infrastructure at locations consistent with planned land uses and with capacities, which are adequate to meet the needs of these planner land uses;
- Retain and expand existing business and industry; and
- Diversify and expand the Eureka County economy.

The Natural Resources and Land Use Plan focuses on natural resource management on federal and state administered lands in Eureka County. Primary goals of this element are as follows:

> To maintain and improve the soil, vegetation and watershed resources in a manner that perpetuates and sustains a diversity of uses while fully supporting the custom, culture, economic stability and viability of Eureka County and its individual citizens.
>
> Facilitate environmentally responsible exploration, development and reclamation of oil, gas, geothermal, locatable minerals, aggregate and similar resources on federal lands.

Other elements in this Master Plan include policies related to the Project. Page 5-9 of the Economic Development Element contains the following policy related to the Project (County of Eureka 2000):

- Eureka County may identify and pursue mining industry induced industrial development opportunities; and
- Eureka County may encourage the productivity of existing "Building Blocks" beginning with such assets of as work force and natural resources including water, minerals, livestock forage, and wildlife.

The Natural Resource and Land Use Plan is an executable policy for natural resource management and land use on federal and state administered lands in Eureka County. The Plan's intention is to engage in decision making that pertains to any and all publically owned and managed lands and natural resources within its jurisdiction, as provided under law.

The Eureka County Master Plan, including the Natural Resource and Land Use Plan, were originally developed in response to Nevada SB 40, which directed the State Land Use Planning Agency to work with local planning entities to prepare local plans and policies regarding the use of federal lands in Nevada. Policies contained within the Master Plan include providing for economic stability, security and growth, social stability, private property rights, local and private management of resources, recreational opportunities, transportation and utility infrastructure, easements and ROWs, and public access to federal and state lands.

Public lands under BLM jurisdiction are managed "...on the basis of multiple use and sustained yield unless otherwise specified by law" (Sec. 102 (a)(7), FLPMA). Sec. 102 (a)(12) of FLPMA also states that, "the public lands be managed in a manner which recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands including

implementation of the MMPA (84 Stat. 1876, 30 U.S.C. 21a) as it pertains to the public lands". The Project Area is contained within the BLM's BMD MLFO. The current operational land use plan for this region is the RMP (BLM 1986a). The plan covers 4.3 million acres of BLM-administered public lands in parts of Lander, Eureka, and Nye Counties.

BLM 43 CFR Subpart 3715 regulations address the unlawful use and occupancy of unpatented mining claims for non-mining purposes. The regulation limits such use and occupancy to that which is reasonably incident.

BLM 43 CFR 2800 regulations address the lawful use and occupancy of public lands through the BLM issuance of ROWs.

3.14.2 Affected Environment

3.14.2.1 Study Methods

The baseline data presented below is based on information from the Plan, Eureka County planning documents, and the MLFO files.

3.14.2.2 Existing Conditions

Approximately 79 percent of Eureka County lands are administered by the federal government. BLM manages the vast majority of the land in the county, while the USFS manages a small percentage of land in the southwestern corner of the county. BLM-administered public lands comprise approximately 74 percent, or 1,969,762 acres, of total federally owned lands in Eureka County (Eureka County 2000). Private lands comprise approximately 21 percent of the county. As described in the Master Plan, the single greatest surface land use within the county is open space agricultural, which is comprised of private farmland and ranches and a series of designated grazing allotments managed by the BLM. Mining represents the next largest land use with the bulk of mining activity concentrated in northeastern Eureka County.

Land uses within the Project Area consist primarily of livestock grazing and mineral exploration. The Project Area is located approximately 23 miles northwest of the Town of Eureka, which as of 2010, has a population of **610** people. The nearest residences to the Project are the Roberts Creek Ranch **to the west**, Alpha Ranch **to the north**, and residences in Diamond Valley **to the east and southeast**, which are approximately 6.5 miles, 14.5 miles north, and 9.3 miles **from the Project**, respectively. **The area in Diamond Valley with private land, which is where residences are located, is shown on Figure 3.14.1.** Livestock grazing on the Project Area and surrounding **allotments** in Eureka County is discussed in Section 3.12.

Historical mining occurred within the Project Area from the 1870s through the 1940s. Exxon Minerals Corporation conducted exploration activities in the late 1970s through the early 1980s. Currently, EML is conducting exploration operations within the Project Area. The closest mining operation to the Project Area is the Ruby Hill Mine, which is adjacent to the Town of Eureka, 23 miles southeast of the Project. Most of the other major mines are located approximately 40 miles or more from the Project.

Existing authorizations located within the Project Area are summarized in Table 3.14-1 and shown on Figure 3.14.1.

3.14.3 Environmental Consequences and Mitigation Measures

3.14.3.1 Significance Criteria

The Proposed Action would normally have a significant effect on land use if the following would occur:

- Result in the termination or substantial modification of a land use;
- Conflict with existing land use authorizations;
- Conflict with adopted land use plans and goals of the community where it is located; or
- Disrupt or divide the physical arrangement of an established community.

Table 3.14-1: BLM Rights-of-Way and Other Authorizations within the Project Area

Serial Number	Right-of-Way	Location		Total Width[1] (feet)
		Township, Range	Sections	
N-63162	Powerline	T20N, R52E	5, 8, 9, 16, 21, 27, 25-28	180
NEV-43007	Highway		19-22, 25, 26	400
NEV-04979	Highway		19-22, 25, 26	400
NEV-06317	Highway		19-22, 25, 26	400
N-56725	Road/Material Site		21, 22, 27, 28	60
N-10758	Telephone Line		20, 25-29, 35, 36	20
N-5253	Powerline		31-36	125
N-82778	Well		26	NA
N-82922	Oil and Gas Lease		4, 5	NA
N-82923	Oil and Gas Lease		6, 7	NA
N-82924	Oil and Gas Lease		8, 9	NA
N-82925	Oil and Gas Lease		15-18	NA
N-82926	Oil and Gas Lease		19-21	NA
CC-021890	Highway	T20N, R53E	4, 5, 8, 9, 16, 21, 27, 28, 34	400
N-5253	Powerline		31, 32, 33, 34, 35	125
N-5638	Powerline		1, 2, 4, 5, 9, 12-14, 18, 19, 21, 23, 26-31, 34, 35	50
N-5700	Power Substation/Powerline		35	NA
N-10758	Telephone Line		30,31	20
N-19754 03	Waste Water Ponds		35	NA
N-19823	Waste Water Delivery Line		35	50
N-31895	Telephone Line		29, 32	20
N-37190	Telephone Line		4, 5, 9, 16, 21, 27, 28, 33-35	VAR
N-48618	Pump/Pipeline		28, 33, 34	50
N-54498	Road		28, 32, 33	66
N-58497	Buried Fiber Optic Line		4, 5, 9, 16, 21, 27, 34	20
N-60801	Pipeline/Road		32	20
N-60802	Powerline		34, 35	25
N-61422	Road		19, 29, 31	33
N-62543	Gravel Pit		32	NA

Serial Number	Right-of-Way	Location		Total Width[1] (feet)
		Township, Range	Sections	
N-63162	Powerline		31-36	160
N-66394	Buried Fiber Optic Line		28-30, 33-36	15
N-74176	Powerline		28, 33	25
N-76179	Buried Fiber Optic Line		28-30, 33-36	15
N-79989	GPS Site		31	NA
N-82778	Well		31	NA
N-0 004979	Highway		28-30, 33-36	400
N-0 006317	Highway		28-30, 33-36	400
N-0 006320	Highway		33	400
N-0 006323	Highway		34	400
N-67106	Telephone Line		2, 14, 23, 26, 35	20
N-76760	Oil and Gas Lease		4, 5	NA
N-80158	Oil and Gas Lease		25, 26, 36	NA
N-83410	Oil and Gas Lease		8, 9, 16, 17	NA
N-83411	Oil and Gas Lease		20, 21, 27, 28	NA
N-83412	Oil and Gas Lease		29, 32-34	NA
N-5638	Powerline	T21N, R50E	2-5	25
N-40118	Well		3	NA
N-40119	Well		23	NA
N-47781	Powerline		2-5, 11, 12	25
N-52399	Road		3-6	66
N-79395	Oil and Gas Lease		5-8	NA
N-47781	Powerline	T21N, R51E	7, 8, 13-17	25
N-79359	Oil and Gas Lease		4-6	NA
N-79360	Oil and Gas Lease		8, 9, 16, 17	NA
N-79361	Oil and Gas Lease		20, 21, 28, 29	NA
N-79362	Oil and Gas Lease		31-33	NA
N-79400	Oil and Gas Lease		7, 18	NA
N-79401	Oil and Gas Lease		19, 30	NA
N-82902	Oil and Gas Lease		14, 16, 24, 26	NA
N-83372	Oil and Gas Lease		1, 2, 11, 12	NA
N-78979	Oil and Gas Lease	T21.N, R52E	2-6	NA
N-5638	Powerline	T22N, R49E	26, 27, 35, 36	25
N-47781	Powerline		26-28, 35, 36	25
N-52399	Road		26, 27, 35, 36	66
N-5638	Powerline	T22N, R50E	31, 32	25
N-47781	Powerline		31, 32	25
N-52399	Road		13, 24, 25, 31, 34-36	66
N-52540	Road		1, 2, 12, 13, 24	VAR
N-53667	Reservoir		13, 24	NA
N-63162	Powerline	T22N, R51E	2, 11, 13, 14, 24, 25, 36	160

Serial Number	Right-of-Way	Location		Total Width[1] (feet)
		Township, Range	Sections	
N-76363	Oil and Gas Lease		20, 21, 28, 29	NA
N-76364	Oil and Gas Lease		31-33	NA
N-79402	Oil and Gas Lease		19, 30	NA
N-83378	Oil and Gas Lease		16-18	NA
N-83379	Oil and Gas Lease		22, 27	NA
N-83380	Oil and Gas Lease		23-26	NA
N-83381	Oil and Gas Lease		34-36	NA
CC-022478	Highway	T22N, R52E	6-8, 16, 17, 21-23, 26, 27, 35	400
N-12655	Powerline		16-18, 21-24	25
N-58497	Buried Fiber Optic Line		6-8, 16, 17, 21-23, 26, 36	20
N-0 001471	Highway		6	400
N-63162	Powerline	T23N, R51E	1, 11, 12, 14, 23, 26, 35	160
N-83392	Oil and Gas Lease		23-26	NA
N-83394	Oil and Gas Lease		34, 35, 36	NA
N-58497	Telephone Line	T23N, R52E	6, 7, 18, 19, 30, 31	20
N-0 001471	Highway		6, 7, 18, 19, 30, 31	400
N-0 001417	Material Site		31	NA
N-78976	Oil and Gas Lease		19-21, 28-33	NA

[1] NA: Not applicable
VAR: Variable

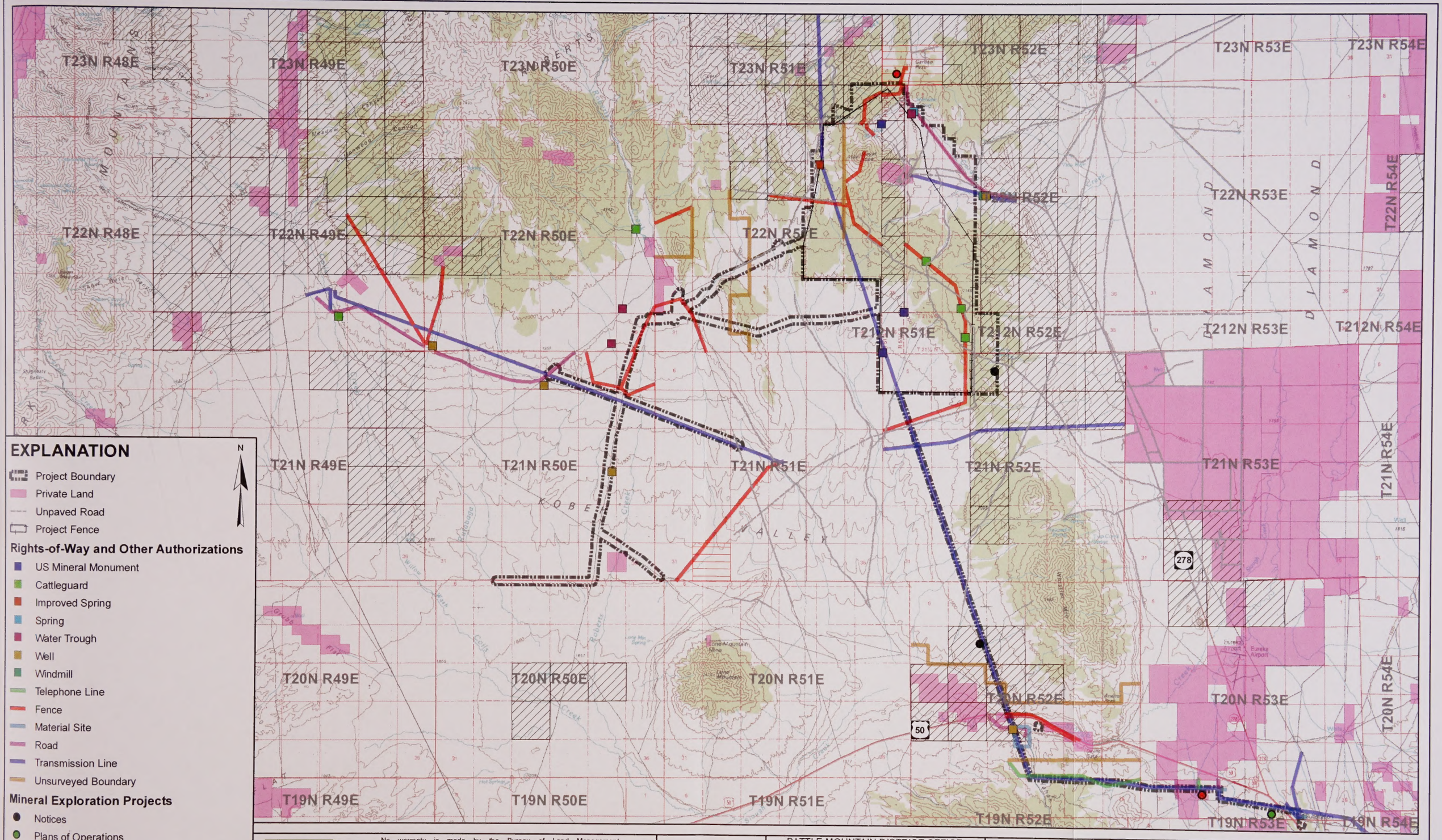
3.14.3.2 Assessment Methodology

The Proposed Action and alternatives are compared with existing land uses, land use plans, any relevant goals, policies, and decisions of those plans, to determine if they would adversely affect these land uses or conflict with existing land use plans. To evaluate impacts to access, the Proposed Action and alternatives were reviewed against existing conditions and federal and county land use plan policies. The significance criteria were then applied to determine if the adverse effects would be considered significant impacts if the Project or an alternative were implemented.

3.14.3.3 Proposed Action

3.14.3.3.1 Short-Term and Long-Term Loss of Public Lands

Implementation of the Proposed Action would result in the temporary disturbance of 8,355 acres of public lands managed for multiple uses and private land within the 14,204-acre fenced portion of the Project Area over as many as 70 years, which includes the mining and reclamation phases of the Project. The locations of the proposed disturbances and area fenced at the end of mining are identified on Figure 2.1.5, and the surface acreage by mine facility component is identified in Table 2.1-1. The fenced area would be temporarily unavailable for current land uses, which consist primarily of livestock grazing and mineral exploration. As outlined in Section 3.12, the Proposed Action would result in the loss of 781 AUMs in the Project Area, which represents a six percent loss of the active grazing preference in the Roberts Mountain and Romano



EXPLANATION

N

- Project Boundary
- Private Land
- Unpaved Road
- Project Fence

Rights-of-Way and Other Authorizations

- US Mineral Monument
- Cattleguard
- Improved Spring
- Spring
- Water Trough
- Well
- Windmill
- Telephone Line
- Fence
- Material Site
- Road
- Transmission Line
- Unsurveyed Boundary

Mineral Exploration Projects

- Notices
- Plans of Operations
- Gravel Operations

Oil and Gas Leases

- Authorized
- Pending

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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0 1 2 3 4 5 6 7 Miles

IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

DESIGN:	EMLLC	DRAWN:	CVD/GSL	REVIEWED:	RFD
CHECKED:	-	APPROVED:	RFD	DATE:	08/23/2012

FILE NAME: p1635_Fig3-14-1_LandUseAuthorizations.mxd

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Land Use Authorizations Within and Adjacent to the Project Area

Figure 3.14.1

Allotments. As described in Section 2.1.17, EML would reclaim the Project Area to provide a post-mining surface condition that would be consistent with the expected long-term land uses, wildlife habitat, livestock grazing, **wild horse habitat,** and possible future mining-related activities.

The open pit, which comprises 734 acres, would not be reclaimed to the pre-mining land use. Following the cessation of mining and open pit dewatering, ground water would be allowed to enter and accumulate within the open pit, forming a pit lake. The BLM has no plans to develop this water-filled pit for recreational purposes. As described in the Proposed Action, to ensure public safety and prevent vehicular and deter livestock access, reclamation of the open pit would include construction of a physical perimeter barricade.

- **Impact 3.14.3.3-1:** Public lands currently utilized for livestock grazing, **wild horse habitat,** and mineral exploration would be removed from use as a result of the construction and operation of the Project. The Proposed Action would result in the removal of 14,204 acres from multiple use as a result of the Project facilities and fencing for the life of the Project. In addition, 8,355 acres of disturbance would occur within the fenced portion of the Project Area. Reclamation would be completed for 7,621 acres, or 91 percent, of the disturbed area (Section 2.1.17). Approximately 734 acres of public land in the vicinity of the open pit would not be reclaimed to the pre-mining land use.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.14.3.3.2 Impacts to Land Use Authorizations

The Proposed Action would not result in any impacts or changes to land ownership within the Project Area. As described in the Proposed Action, the Project would result in some changes to the existing ROWs and other authorizations within the Project Area. ROWs proposed for the Project include the following: a 230-kV transmission line from the Machacek Substation to the Project Substation located near the proposed mill; and a ROW (N-63162) amendment associated with the reroute of the 345-kV Falcon-Gondor transmission line. A powerline (ROW N-12655) that extends from SR 278 to the historic Hope Mine would be affected by the construction of the Project processing facilities (Figure 3.14.1). In addition, the BLM has approved three cattle guards and three fences as range improvement and constructed two mineral monuments within the mine area portion of the Project Area that would be altered or removed as part of the Proposed Action (Figure 3.14.1).

The transmission line from Machacek Substation to the Project can be reclaimed after mining. Wells located in the Kobeh Valley Well Field area would be plugged and abandoned at the cessation of mining and reclamation. The Falcon-Gondor transmission line that would be rerouted would be left in place. The BLM would be notified if the ROW or a portion of the ROW would be relinquished by EML. The BLM would subsequently amend the ROW grant as required.

- **Impact 3.14.3.3-2:** Public lands currently occupied by ROWs and other land use authorizations would be altered, which would result in the alteration or removal of up to 15 ROWs and other land use authorizations.

  Significance of the Impact: This impact is considered less than significant; however, mitigation measures are considered appropriate.

- **Mitigation Measure 3.14.3.3-2:** EML would, in consultation with the BLM and authorized holders of the affected ROWs, reestablish the structures that would be altered or removed, as appropriate.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this mitigation measure would be effective at maintaining the impact level as less than significant by reestablishing the authorized structures that would be removed or altered during Project construction and operation.

3.14.3.3.3 Land Use Plans and Goals

Plans and regulations currently in place to guide development in Eureka County include the following: Eureka County Master Plan (2010); Titles 8 and 9 of the Eureka County Code; and the BLM's RMP (BLM 1986a). The Proposed Action would not conflict with any federal land use plans or regulations. EML's proposed use of public lands under the Proposed Action is reasonably incident under the BLM's occupancy regulations at 43 CFR 3715. Some elements of the Proposed Action would be in conformance with Eureka County plans and policies while other elements of the proposed mine could prove inconsistent with these plans and policies. Potential inconsistencies identified by Eureka County are disclosed in Appendix A with a discussion of the efforts to reconcile or the rationale of the decision maker where reconciliation has not been achieved. The Proposed Action would not otherwise impact land use authorizations.

3.14.3.3.4 Disruption or Division of an Established Community

The Proposed Action would not disrupt or divide the physical arrangement of an established community. As described previously in Section 3.14.2.1.1, Existing Conditions, the closest community to the Project Area is the Town of Eureka, approximately 23 miles southeast of the Project Area. The closest residences to the Project Area are the Roberts and Alpha ranches, approximately five miles northwest and north, respectively. The existing land uses within the Project Area consist primarily of livestock grazing**, wild horse habitat,** and mineral exploration. Since there is no established community within the Project Area or within the vicinity of the Project Area, the Proposed Action would not disrupt or divide the physical arrangement of an established community.

3.14.3.3.5 Impacts to Private Land Uses

The Proposed Action has the potential to result in indirect impacts to private lands that are in the vicinity of the Project. Private lands controlled by EML are not included in this analysis (refer to the Proposed Action in Section 2.1 for a description of direct effects to EML's private land). The potential indirect effects are a result of the ground water drawdown resulting for Project pumping activities. Section 3.2.3 of the EIS describes those

ground water effects. The potential indirect effects to private land include the lowering of the water levels in wells (see Section 3.2.3), the reduction of flows in creeks that cross the private land (see Section 3.2.3), or a decrease in vegetation that is reliant of surface water or near surface ground water (see Sections 3.2.3, 3.9.3, and 3.11.3). In addition, there could be a reduction in the water that is available for agricultural irrigation of livestock watering (see Section 3.12.3).

- **Impact 3.14.3.3-3: The Proposed Action would have a potential indirect effect to private land uses as a result of ground water drawdown.**

  Significance of the Impact: This impact is considered potentially significant; however, mitigation measures described in Section 3.2.3 are considered appropriate to reduce the impact to less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures. See Section 3.26 for suggested mitigation outside the BLM's jurisdiction.

3.14.3.3.6 Residual Adverse Impacts

The Proposed Action would result in the unavoidable loss of 734 acres of public lands utilized for livestock grazing, **wild horse habitat,** and mineral exploration resulting from surface disturbance associated with the open pit; however, there would be no residual impacts to land use.

3.14.3.4 No Action Alternative

3.14.3.4.1 Short-Term and Long-Term Loss of Public Lands

Under the No Action Alternative, EML is currently authorized under **seven** Notices to disturb approximately **35** acres of public land as a result of the exploration and development of the Project. Facilities and operations that have been approved but not yet completed would have impacts on land use and access. Public lands managed for multiple uses within the Project Area that have been proposed for surface disturbance and fencing would remain accessible.

No additional public lands would be removed from multiple use management, and impacts to land use would be limited to ongoing permitted mining and exploration activities.

3.14.3.4.2 Impacts to Land Use Authorizations

Under the No Action Alternative, EML is currently authorized under **seven** Notices to disturb approximately **35** acres of public land as a result of the exploration and development of the Project. Continuation of these Notices would be required to adhere to regional and local land use plans and regulations similar to the Proposed Action, which include: the Eureka County Master Plan (2010); the Natural Resources and Federal or State Land Use Element of the Eureka County Master Plan; and the BLM's RMP (BLM 1986a). Therefore, the No Action Alternative would not result in impacts to land use authorizations.

3.14.3.4.3 Land Use Plans and Goals

The No Action Alternative would not conflict with land use plans and regulations currently in place to guide development in Eureka County. These plans and regulations include the following: the Eureka County Master Plan (2010); the Natural Resources and Federal or State Land Use Element of the Eureka County Master Plan; and the BLM's RMP (BLM 1986a). The No Action Alternative would not otherwise impact land use authorizations.

3.14.3.4.4 Disruption or Division of an Established Community

Under the No Action Alternative, EML would continue existing surface disturbing activities within the Project Area. As discussed previously, there is no established community within the Project Area or in the vicinity of the Project Area. Therefore, there would be no impacts to the disruption or division of the physical arrangement of an established community under the No Action Alternative.

3.14.3.4.5 Impacts to Private Land Uses

Under the No Action Alternative there would be no indirect impacts to private lands that are in the vicinity of the Project.

3.14.3.4.6 Residual Adverse Impacts

There would be no residual impacts to land use under the No Action Alternative, other than those impacts caused by permitted operations at the Project.

3.14.3.5 Partial Backfill Alternative

3.14.3.5.1 Short-Term and Long-Term Loss of Public Lands

Implementation of the Partial Backfill Alternative would result in the temporary disturbance of 8,**355** acres of public lands managed for multiple uses and private land within the 14,204-acre fenced portion of the Project Area over as much as 70 years, which include the mining and reclamation phases of the Project. The locations of the proposed disturbances and fenced area are identified on Figure 2.1.5. The end of mining surface acreage by mine facility component is identified in Table 2.1-1. The fenced area would be temporarily unavailable for current land uses, which consist primarily of livestock grazing**, wild horse habitat,** and mineral exploration. As outlined in Section 3.12, the Partial Backfill Alternative would result in the loss of 781 AUMs in the Project Area, which represents six percent loss of the active grazing preference in the Roberts Mountain and Romano Allotments. As described in Section 2.1.17, EML would reclaim the Project Area to provide a post-mining surface condition that would be consistent with the expected long-term land uses, wildlife habitat, livestock grazing, **wild horse habitat,** and possible future mining-related activities.

The backfilled portion of the open pit would be reclaimed (527 acres), which would leave the remaining open pit highwalls that would not be reclaimed to the pre-mining land use, which comprises 206 acres; however, to ensure public safety and prevent vehicular and deter livestock access, reclamation of the open pit would include construction of a physical perimeter barricade, which is similar to the Proposed Action. As a result, there would be less of an impact to long-term loss of public lands.

- **Impact 3.14.3.5-1:** Public lands currently utilized for livestock grazing, **wild horse habitat,** and mineral exploration would be removed from use as a result of the construction and operation of the Project. The **Partial Backfill Alternative** would result in the removal of 14,204 acres from multiple use as a result of the Project facilities and fencing. In addition, 8,355 acres of disturbance would occur within the fenced portion of the Project Area. Reclamation would be completed for 7,621 acres, or 91 percent, of the disturbed area (Section 2.1.17). Approximately 734 acres of public land in the vicinity of the open pit would be partially reclaimed, but not available to wildlife habitat pre-mining land use.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.14.3.5.2 Impacts to Land Use Authorizations

The Partial Backfill Alternative would not result in any impacts or changes to land ownership within the Project Area. This alternative would result in some changes to the existing ROWs within the Project Area. Changes to the existing ROWs proposed for the Project include the following: a 230-kV transmission line from the Machacek Substation to the Project Substation located near the proposed mill; and a ROW amendment associated with the reroute of the 345-kV Falcon-Gondor transmission line. In addition, the BLM has authorized three windmills, and three fences as range improvements and constructed three mineral monuments within the mine area portion of the Project Area that would be either altered or removed as part of the Proposed Action.

The transmission line from Machacek Substation to the Project can be reclaimed after mining. Wells located in the Kobeh Valley Well Field area would be plugged and abandoned at the cessation of mining and reclamation. The Falcon-Gondor transmission line that would be rerouted would be left in place. The BLM would be notified if the ROW or a portion of the ROW would be relinquished by EML. The BLM could subsequently amend the ROW grant as required.

- **Impact 3.14.3.5-2:** Public lands currently occupied by ROWs and land use authorizations would be altered, which would result in the alteration or removal of up to 15 ROWs and land use authorizations.

  Significance of the Impact: This impact is considered less than significant; however, mitigation measures are considered appropriate.

- **Mitigation Measure 3.14.3.5-2:** EML would, in consultation with the BLM and authorized holders of the affected ROWs, reestablish the structures that would be altered or removed, as appropriate.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this mitigation measure would be effective at maintaining the impact level as less than significant by reestablishing the authorized structures that would be removed or altered during Project construction and operation.

3.14.3.5.3 Land Use Plans and Goals

Plans and regulations currently in place to guide development in Eureka County include the Eureka County Master Plan (2010); Titles 8 and 9 of the Eureka County Code; and the BLM's RMP (BLM 1986a). The Proposed Action would not conflict with any federal land use plans or regulations. EML's proposed use of public lands under the proposed action is reasonably incident under the BLM's occupancy regulations at 43 CFR 3715. Some elements of the Proposed Action would be in conformance with Eureka County plans and policies while other elements of the proposed mine could prove inconsistent with these plans and policies. Potential inconsistencies identified by Eureka County are disclosed in Appendix A with an indication if each conflict has been reconciled and either the method of reconciliation if it has or the rationale of the decision maker where reconciliation has not been achieved. The Partial Backfill Alternative would not otherwise impact land use authorizations.

3.14.3.5.4 Disruption or Division of an Established Community

The Partial Backfill Alternative would only disturb lands within the Project Area. As previously discussed, there is no established community within the Project Area or within the vicinity of the Project Area. Therefore, the Partial Backfill Alternative would not disrupt or divide the physical arrangement of an established community.

3.14.3.5.5 Impacts to Private Land Uses

The Partial Backfill Alternative has the potential to result in indirect impacts to private lands that are in the vicinity of the Project. Private lands controlled by EML are not included in this analysis (refer to the Proposed Action in Section 2.1 for a description of direct effects to EML's private land). The potential indirect effects are a result of the ground water drawdown resulting for Project pumping activities. Section 3.2.3 of the EIS describes those ground water effects. The potential indirect effects to private land include the lowering of the water levels in wells (see Section 3.2.3), the reduction of flows in creeks that cross the private land (see Section 3.2.3), or a decrease in vegetation that is reliant of surface water or near surface ground water (see Sections 3.2.3, 3.9.3, and 3.11.3). In addition, there could be a reduction in the water that is available for agricultural irrigation of livestock watering (see Section 3.12.3).

- **Impact 3.14.3.5-3: The Partial Backfill Alternative would have a potential indirect effect to private land uses as a result of ground water drawdown.**

  Significance of the Impact: This impact is considered potentially significant; however, mitigation measures described in Section 3.2.3 are considered appropriate to reduce the impact to less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures. See Section 3.26 for suggested mitigation outside the BLM's jurisdiction.

3.14.3.5.6 Residual Adverse Impacts

The Partial Backfill Alternative would result in the unavoidable loss of 734 acres of public lands utilized for livestock grazing, **wild horse habitat,** and mineral exploration, resulting from surface disturbance of the open pit area.

3.14.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

3.14.3.6.1 Short-Term and Long-Term Loss of Public Lands

Implementation of the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the temporary disturbance of 8,355 acres of public lands managed for multiple uses and private land within the 14,204-acre fenced portion of the Project Area over as much as 70 years, which include the mining and reclamation phases of the Project. The locations of the proposed disturbances and fenced area are identified on Figure 2.1.5. The end of mining surface acreage by mine facility component is identified in Table 2.1-1. The fenced area would be temporarily unavailable for current land uses, which consist primarily of livestock grazing, **wild horse habitat,** and mineral exploration. As outlined in Section 3.12, the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the loss of 781 AUMs which represents a six percent loss of the active grazing preference in the Roberts Mountain and Romano Allotments. As described in Section 2.1.17, EML would reclaim the Project Area to provide a post-mining surface condition that would be consistent with the expected long-term land uses, wildlife habitat, livestock grazing, **wild horse habitat,** and possible future mining-related activities.

The open pit, which comprises 734 acres, would not be reclaimed to the pre-mining land use. Following the cessation of mining and open pit dewatering, ground water would be allowed to enter and accumulate within the open pit, forming a pit lake. The BLM has no plans to develop this water-filled pit for recreational purposes. As described in the Off-Site Transfer of Ore Concentrate for Processing Alternative, to ensure public safety and prevent vehicular and deter livestock access, reclamation of the open pit would include construction of a physical perimeter barricade. As a result, there would be less of an impact to long-term loss of public lands.

- **Impact 3.14.3.6-1:** Public lands currently utilized for livestock grazing, **wild horse habitat,** and mineral exploration would be removed from use as a result of the construction and operation of the Project. The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the removal of 14,204 acres from multiple use as a result of the Project facilities and fencing. In addition, 8,355 acres of disturbance would occur within the fenced portion of the Project Area. Reclamation would be completed for 7,621 acres, or 91 percent, of the disturbed area (Section 2.1.17). Approximately 734 acres of public land in the vicinity of the open pit would not be reclaimed to the pre-mining land use.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.14.3.6.2 Impacts to Land Use Authorizations

The Off-Site Transfer of Ore Concentrate for Processing Alternative would not result in any impacts or changes to land ownership within the Project Area. As described in the Off-Site Transfer of Ore Concentrate for Processing Alternative, the Project would result in some changes to the existing ROWs within the Project Area. Changes to the existing ROWs proposed for the Project include the following: a 230-kV transmission line from the Machacek Substation to the Project Substation located near the proposed mill; and a ROW amendment associated with the reroute of the 345 kV Falcon-Gondor transmission line. In addition, the BLM has authorized three windmills, and three fences as range improvements and constructed three mineral monuments within the mine area portion of the Project Area that would either be altered or removed as part of the Off-Site Transfer of Ore Concentrate for Processing Alternative.

The transmission line from Machacek Substation to the Project can be reclaimed after mining. Wells located in the Kobeh Valley Well Field area would be plugged and abandoned at the cessation of mining and reclamation. The Falcon-Gondor transmission line that would be rerouted would be left in place. The BLM would be notified if the ROW or a portion of the ROW would be relinquished by EML. The BLM could subsequently amend the ROW grant as required.

- **Impact 3.14.3.6-2:** Public lands currently occupied by ROWs and land use authorizations would be altered, which would result in the alteration or removal of up to 15 ROWs and land use authorizations.

  Significance of the Impact: This impact is considered less than significant; however mitigation measures are considered appropriate.

- **Mitigation Measure 3.14.3.6-2:** EML would, in consultation with the BLM and authorized holders of the affected ROWs, reestablish the structures that would be altered or removed, as appropriate.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this mitigation measure would be effective at maintaining the impact level as less than significant by reestablishing the authorized structures that would be removed or altered during Project construction and operation.

3.14.3.6.3 Land Use Plans and Goals

Plans and regulations currently in place to guide development in Eureka County include the Eureka County Master Plan (2010); Titles 8 and 9 of the Eureka County Code; and the BLM's RMP (BLM 1986a). The Proposed Action would not conflict with any federal land use plans or regulations. EML's proposed use of public lands under the proposed action is reasonably incident under the BLM's occupancy regulations at 43 CFR 3715. Some elements of the Proposed Action would be in conformance with Eureka County plans and policies while other elements of the proposed mine could prove inconsistent with these plans and policies. Potential inconsistencies identified by Eureka County are disclosed in Appendix A with an indication if each conflict has been reconciled and either the method of reconciliation if it has or the rationale of the decision maker where reconciliation has not

been achieved. The Off-Site Transfer of Ore Concentrate for Processing Alternative would not otherwise impact land use authorizations.

3.14.3.6.4 Disruption or Division of an Established Community

The Off-Site Transfer of Ore Concentrate for Processing Alternative would only disturb lands within the Project Area. As previously discussed, there is no established community within the Project Area or within the vicinity of the Project Area. Therefore, the Off-Site Transfer of Ore Concentrate for Processing Alternative would not disrupt or divide the physical arrangement of an established community from the Partial Backfill Alternative.

3.14.3.6.5 Impacts to Private Land Uses

The Off-Site Transfer of Ore Concentrate for Processing Alternative has the potential to result in indirect impacts to private lands that are in the vicinity of the Project. Private lands controlled by EML are not included in this analysis (refer to the Proposed Action in Section 2.1 for a description of direct effects to EML's private land). The potential indirect effects are a result of the ground water drawdown resulting for Project pumping activities. Section 3.2.3 of the EIS describes those ground water effects. The potential indirect effects to private land include the lowering of the water levels in wells (see Section 3.2.3), the reduction of flows in creeks that cross the private land (see Section 3.2.3), or a decrease in vegetation that is reliant of surface water or near surface ground water (see Sections 3.2.3, 3.9.3, and 3.11.3). In addition, there could be a reduction in the water that is available for agricultural irrigation of livestock watering (see Section 3.12.3).

- **Impact 3.14.3.6-3: The Off-Site Transfer of Ore Concentrate for Processing Alternative would have a potential indirect effect to private land uses as a result of ground water drawdown.**

  Significance of the Impact: This impact is considered potentially significant; however, mitigation measures described in Section 3.2.3 are considered appropriate to reduce the impact to less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures. See Section 3.26 for suggested mitigation outside the BLM's jurisdiction.

3.14.3.6.6 Residual Adverse Impacts

The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the unavoidable loss of 734 acres of public lands utilized for livestock grazing, **wild horse habitat,** and mineral exploration, resulting from surface disturbance of the open pit area.

3.14.3.7 Slower, Longer Project Alternative

Impacts to land use from the Slower, Longer Project Alternative are expected to be similar to impacts from the Proposed Action at the end of the Project; however, impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action.

3.14.3.7.1 Short-Term and Long-Term Loss of Public Lands

Implementation of the Slower, Longer Project Alternative would result in the temporary disturbance of 8,355 acres of public lands managed for multiple uses and private land within the 14,204-acre fenced portion of the Project Area over as much as 115 years, which include the mining and reclamation phases of the Project. The locations of the proposed disturbances and fenced area are identified on Figure 2.1.5. The end of mining surface acreage by mine facility component is identified in Table 2.1-1. The fenced area would be temporarily unavailable for current land uses, which consist primarily of livestock grazing, **wild horse habitat,** and mineral exploration. As outlined in Section 3.12, the Slower, Longer Project Alternative would result in the loss of 781 AUMs which represents a six percent loss of the active grazing preference in the Roberts Mountain and Romano Allotments. As described in Section 2.1.17, EML would reclaim the Project Area to provide a post-mining surface condition that would be consistent with the expected long-term land uses, wildlife habitat, livestock grazing, **wild horse habitat,** and possible future mining-related activities.

The open pit, which comprises 734 acres, would not be reclaimed to the pre-mining land use. Following the cessation of mining and open pit dewatering, ground water would be allowed to enter and accumulate within the open pit, forming a pit lake. The BLM has no plans to develop this water-filled pit for recreational purposes. As described in the Slower, Longer Project Alternative, to ensure public safety and prevent vehicular and deter livestock access, reclamation of the open pit would include construction of a physical perimeter barricade. As a result, there would be less of an impact to long-term loss of public lands.

- **Impact 3.14.3.7-1:** Public lands currently utilized for livestock grazing, **wild horse habitat,** and mineral exploration would be removed from use as a result of the construction and operation of the Project. The Slower, Longer Project Alternative would result in the removal of 14,204 acres from multiple use as a result of the Project facilities and fencing. In addition, 8,355 acres of disturbance would occur within the fenced portion of the Project Area. Reclamation would be completed for 7,621 acres, or 91 percent, of the disturbed area (Section 2.1.17). Approximately 734 acres of public land in the vicinity of the open pit would not be reclaimed to the pre-mining land use.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.14.3.7.2 Impacts to Land Use Authorizations

The Slower, Longer Project Alternative would not result in any impacts or changes to land ownership within the Project Area. As described in the Slower, Longer Project Alternative, the Project would result in some changes to the existing ROWs within the Project Area. Changes to the existing ROWs proposed for the Project include the following: a 230-kV transmission line from the Machacek Substation to the Project Substation located near the proposed mill; and a ROW amendment associated with the reroute of the 345 kV Falcon-Gondor transmission line. In addition, the BLM has authorized three windmills, and three fences as range improvements and constructed three mineral monuments within the mine area portion of the Project Area that would either be altered or removed as part of the Slower, Longer Project Alternative.

The transmission line from Machacek Substation to the Project can be reclaimed after mining. Wells located in the Kobeh Valley Well Field area would be plugged and abandoned at the cessation of mining and reclamation. The Falcon-Gondor transmission line that would be rerouted would be left in place. The BLM would be notified if the ROW or a portion of the ROW would be relinquished by EML. The BLM could subsequently amend the ROW grant as required.

- **Impact 3.14.3.7-2:** Public lands currently utilized for ROWs **and other land use authorizations** would be altered, which would result in the alteration or removal of up to 15 ROWs **and other land use authorizations**.

  Significance of the Impact: This impact is considered less than significant; however, mitigation measures are considered appropriate.

- **Mitigation Measure 3.14.3.7-2:** EML would, in consultation with the BLM and authorized holders of the affected ROWs **and other land use authorizations**, reestablish the structures that would be altered or removed, as appropriate.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this mitigation measure would be effective at maintaining the impact level as less than significant by reestablishing the authorized structures that would be removed or altered during Project construction and operation.

3.14.3.7.3 Land Use Plans and Goals

Plans and regulations currently in place to guide development in Eureka County include the Eureka County Master Plan (2010); Titles 8 and 9 of the Eureka County Code; and the BLM's RMP (BLM 1986a). The Proposed Action would not conflict with any federal land use plans or regulations. EML's proposed use of public lands under the proposed action is reasonably incident under the BLM's occupancy regulations at 43 CFR 3715. Some elements of the Proposed Action would be in conformance with Eureka County plans and policies while other elements of the proposed mine could prove inconsistent with these plans and policies. Potential inconsistencies identified by Eureka County are disclosed in Appendix A with an indication if each conflict has been reconciled and either the method of reconciliation if it has or the rationale of the decision maker where reconciliation has not been achieved. The Slower, Longer Project Alternative would not otherwise impact land use authorizations.

3.14.3.7.4 Disruption or Division of an Established Community

The Slower, Longer Project Alternative would not disrupt or divide the physical arrangement of an established community.

3.14.3.7.5 Impacts to Private Land Uses

The Slower, Longer Project Alternative has the potential to result in indirect impacts to private lands that are in the vicinity of the Project. Private lands controlled by EML are not included in this analysis (refer to the Proposed Action in Section 2.1 for a description of direct effects to the EML private land). The potential indirect effects are a result of the

ground water drawdown resulting for Project pumping activities. Section 3.2.3 of the EIS describes those ground water effects. The potential indirect effects to private land include the lowering of the water levels in wells (see Section 3.2.3), the reduction of flows in creeks that cross the private land (see Section 3.2.3), or a decrease in vegetation that is reliant of surface water or near surface ground water (see Sections 3.2.3, 3.9.3, and 3.11.3). In addition, there could be a reduction in the water that is available for agricultural irrigation of livestock watering (see Section 3.12.3).

- **Impact 3.14.3.7-3: The Slower, Longer Project Alternative would have a potential indirect effect to private land uses as a result of ground water drawdown.**

  Significance of the Impact: This impact is considered potentially significant; however, mitigation measures described in Section 3.2.3 are considered appropriate to reduce the impact to less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures. See Section 3.26 for suggested mitigation outside the BLM's jurisdiction.

3.14.3.7.6 Residual Adverse Impacts

The Slower, Longer Project Alternative would result in the unavoidable loss of 734 acres of public lands utilized for livestock grazing**, wild horse habitat,** and mineral exploration, resulting from surface disturbance of the open pit area.

3.15 Recreation and Wilderness Study Areas

3.15.1 Regulatory Framework

Federal, state, and local laws, regulations, guidelines, and procedures that apply to the management of recreation and wilderness resources include the following: Eureka County Master Plan; Nevada Statewide Comprehensive Outdoor Recreation Plan (SCORP); FLPMA; RMP; Land and Resource Management Plan for the Toiyabe National Forest; Wilderness Act of 1964, as amended; BLM Manual 8560/H-8560-1 (Management of Designated Wilderness Areas); BLM Manual 8561 (Wilderness Management Plans); and Interim Management Policy (IMP) for Lands Under Wilderness Review H-8550-1.

The Eureka County 1973 Master Plan, updated in 2010, contains a description of land uses, restrictions on development, and recommendations for future land use planning. The Natural Resources and Federal or State Land Use Element updated in 2000 and again in 2010, was originally developed and included into the Plan in response to Nevada **SB** 40 (1983) which directs counties to develop plans and strategies for resources that occur within lands managed by federal and state agencies. Hunting, fishing, and outdoor recreation is specifically addressed in the Natural Resources and Federal or State Land Use Element of the Master Plan, which describes and establishes the following recreation goals:

> Provide for multiple recreation uses on Eureka County federal and state administered lands located within its boundaries for residents and visitors to the County. Provide recreational uses including high quality recreational opportunities and experiences at

> developed and dispersed/undeveloped recreation sites by allowing historic uses and access while maintaining existing amenities and by providing new recreation sites for public enjoyment. Pursue increased public access opportunities in both motorized and non-motorized settings through the acquisition of ROWs or easements across federal administered lands and private lands at the invitation of the property owner. Recognize that multiple recreation uses are mandated by the multiple use concepts and that adequate outdoor recreation resources must be provided on the federal administered areas; keeping open all existing access roads and the ability to maintain those same roads or accesses (Eureka County 2010).

The Nevada SCORP "provides information and recommendations to minimize uncertainty in the decision-making process of allocating outdoor recreation resources. In Nevada, the SCORP is the framework for the presentation and dissemination of outdoor recreation information on a statewide basis" (Nevada Division of State Parks 2010). Completion of the SCORP completed in 2010 is one of the requirements for the state to maintain eligibility for federal financial assistance through the Land and Water Conservation Fund Act of 1965 and the SCORP guides the expenditure of money provided through this program. The SCORP also provides a means for coordination between recreation providers in the state and enables each provider to assess their operations and to consider issues, actions, activities, and needs on a statewide level. The goal of the SCORP is to increase and improve the quality of outdoor recreation opportunities in Nevada (Nevada Division of State Parks 2010). The SCORP also includes specific strategies to address the most pressing outdoor recreational issues. Strategy Four specifically states, "Promote conservation of statewide water resources and wildland areas. Strive to work with partners to gain landscape level conservation: river, riparian and natural water bodies, and land conservation for wildlife and their habitats" (Nevada Division of State Parks 2010, page 27).

As shown in Figure 3.15.1, there are no designated wilderness areas within or adjacent to the study area for recreation and wilderness; however, the Roberts Mountain Wilderness Study Area (WSA) and a portion of the Simpson Park WSA are within the study area. The BLM's IMP for Lands Under Wilderness Review (BLM 1995) guides management decisions made for specific areas of public lands under wilderness review by Congress. The policy applies to the following: (a) WSAs identified by the wilderness review required by Section 603 of the FLPMA; (b) WSAs established by Congress; and (c) WSAs identified through the land use planning process in Section 202 of FLPMA. The purpose of the IMP is to prevent impairment of the wilderness values, described in Section 2 (c) of the Wilderness Act of 1964 (P.L. 88/577). WSAs are managed under the IMP until such time as Congress makes a determination regarding wilderness designation. The IMP would apply to the WSAs in the study area; however, there are no WSAs located within the Project Area (Figure 3.15.1).

The study area is located primarily on public land within the Shoshone-Eureka Resource Area. A portion of the study area is also located on **National Forest System (**NFS) lands within the Humboldt-Toiyabe National Forest, which is administered by the Austin Ranger District of the USFS. Recreation policies within the Shoshone-Eureka Resource Area and the Humboldt-Toiyabe National Forest are guided by the BLM's RMP and the USFS's Land and Resource Management Plan for the Toiyabe National Forest, respectively. The majority of the lands within the Project Area and the study area are designated for multiple use.

3.15.2 Affected Environment

3.15.2.1 Study Methods

The baseline data presented below are based on information from public agency maps and reports including the Nevada SCORP and from communications with federal, state, county, and community officials.

The study area for recreation and wilderness resources is defined as an area generally bounded by the Simpson Park Range, Pine Valley, Newark Valley and approximately 30 miles south of Eureka, which includes the Fish Creek Range, Mahogany Hills, Ninemile Peak, and the northern portions of the Antelope and Monitor Ranges (Figure 3.15.1). This area was based on topography and inclusion of areas typically used by residents of Eureka and Diamond Valley. All federal, state, local, and private recreation areas are included within the study area and are outlined under the existing conditions subsection.

3.15.2.2 Existing Conditions

3.15.2.2.1 Recreation

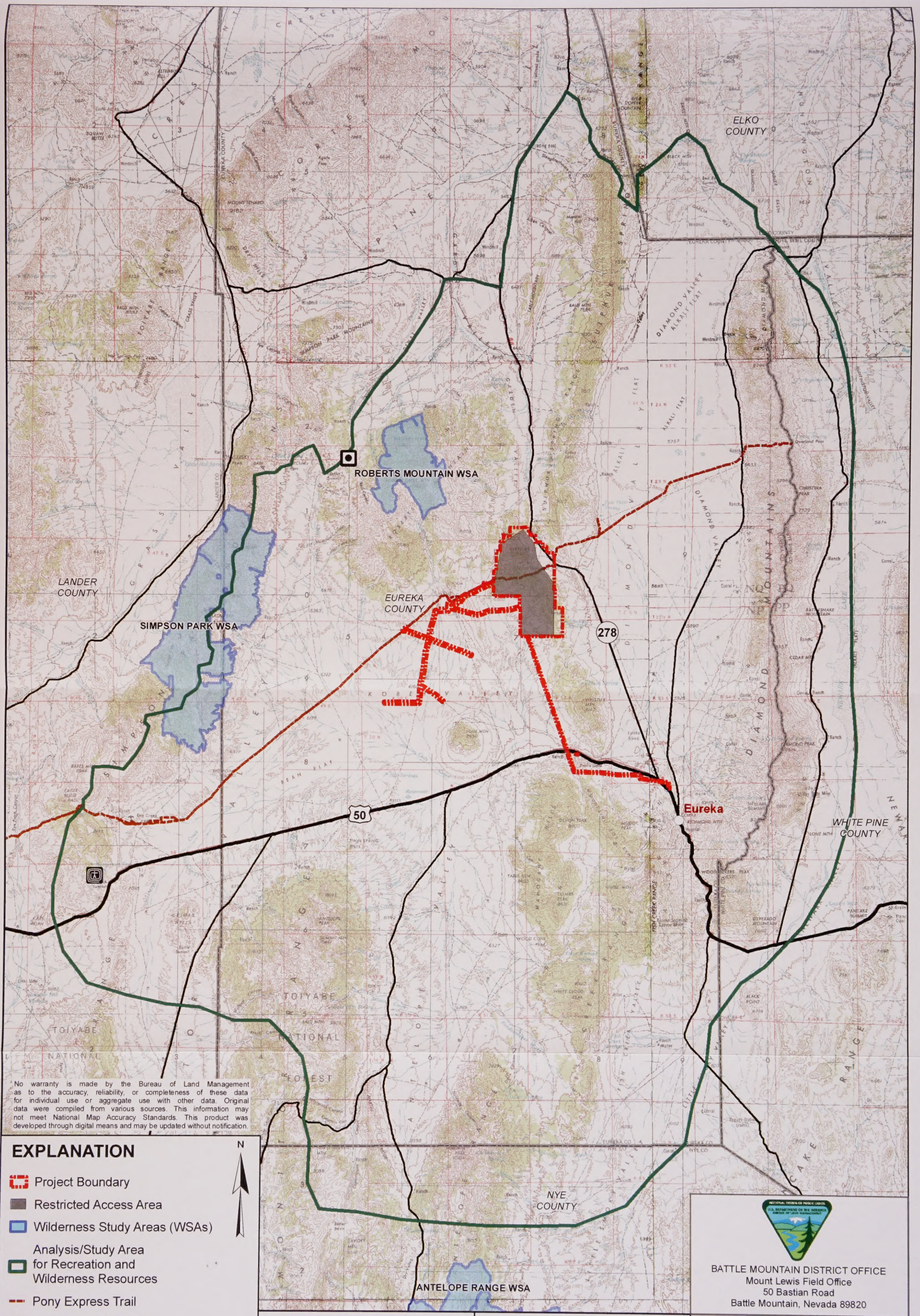
Dispersed recreation is the predominant type of recreation within the study area and the surrounding region. The area attracts thousands of visitors annually because a wide variety of outdoor recreation activities occur on BLM-administered lands. There is one developed recreation site, Hickison Petroglyph Recreation Site. All other recreation is of a dispersed nature. The most popular recreation activities include sightseeing, pleasure driving, rock collecting, photography, winter sports, off-highway vehicle **(OHV)** use, mountain biking, picnicking, camping, fishing, hunting, horseback riding, and hiking. This wide range of opportunities is possible because virtually all of the public lands in the study area are accessible and offer a variety of settings suitable for different recreational activities. Dispersed recreational activities have not required major improvements for recreational purposes, as existing roads and trails are the primary facilities associated with these activities, and visitors usually travel on a previously used or marked motorized vehicle route to reach a recreation site or trailhead. Surface disturbance has occurred as a result of dispersed recreation activities and is evaluated in the cumulative impacts discussion (Chapter 4) to the extent possible. Disturbance from dispersed recreation cannot be readily quantified.

Recreational opportunities are grouped along a continuum of opportunities ranging from intensive vehicle-oriented activities at one end to non-motorized activities undertaken in a primitive setting at the other, although there is often overlap between the two. Table 3.15-1 lists the recreational areas, or portions of recreational areas, within the study area and the estimated annual visitors for 2006.

High Use Recreation Areas

Hickison Petroglyph Recreation Site

The Hickison Petroglyph Recreation Site is located approximately 24 miles east of Austin, Nevada, along U.S. Highway 50. The site is the most popular recreational destination in the study area with more than 21,000 visitors in 2006. Recreational opportunities at this site include



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

EXPLANATION

- Project Boundary
- Restricted Access Area
- Wilderness Study Areas (WSAs)
- Analysis/Study Area for Recreation and Wilderness Resources
- Pony Express Trail

BLM Recreation Sites

- Hickson Petroglyph Site
- Tonkin Spring

N

0 2 4 6 8 10 Miles

DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD
CHECKED: -	APPROVED: RFD	DATE: 08/01/2012
FILE NAME: p1635_Fig3-15-1_Wilderness&Rec.mxd		

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

DRAWING TITLE:

Wilderness Study Areas and Recreation Sites

Figure 3.15.1

petroglyph viewing, hiking, picnicking, camping, and horseback riding. Originally developed in 1968, the site has 16 camp sites, four picnic sites, three restrooms, and a 0.3 mile interpretive trail. Most visitors stay only 20 to 60 minutes; long enough to visit the petroglyphs. It is estimated that approximately 2,500 visitors a year spend at least one night in the campground. In 2005, 81 percent of the visitors who logged their name in the registration book at the site were from outside of Nevada and six percent were from outside of the U.S. Many visitors have visited the site on more than one occasion. An increasing number of visitors are considering the Hickison Petroglyph Recreation Site their destination rather than as a stopover on their way somewhere else. Recent developments at Hickison include construction of more than 13 miles of equestrian/hiker trails and installation of a trailhead with connector trails to the campground.

Table 3.15-1: Recreational Areas and Estimated Annual Visitors for 2006

Recreation Area	Estimated Annual Visitors
Antelope Range (Portion)	630
Hickison Petroglyph Recreation Site	21,870
Roberts Mountain	968
Roberts Mountain WSA	487
Simpson Park Mountains	739
Simpson Park WSA	150
Tonkin Spring	612
Pony Express National Historic Trail	230
Pony Express National Historic Trail Annual Re-ride	45
Dispersed Recreation	26,000
Total Estimated Recreation Visitors in the Study Area	51,731

Future funding would allow a total of 30 to 50 miles of trail to be built. The trail system would include a portion of the Pony Express National Historic Trail. Additional funding would also allow construction of new camp loops and improvements to existing facilities. Many visitors combine their visit to Hickison with a visit to the nearby Spencer Hot Springs, which is a popular natural hot spring site. Visitor feedback has shown a need for increased hiking/equestrian opportunities in the area.

Roberts Creek, Pete Hanson Creek, and Tonkin Springs

The Roberts Mountains in general, and Roberts Creek, Pete Hanson Creek, and Tonkin Springs in particular, are areas that receive a high level of use from locals and visitors. These areas provide numerous recreational opportunities, including fishing (Roberts Creek and Tonkin Reservoir are stocked by the NDOW), hiking, wildlife viewing, and hunting. Additionally, the Roberts Creek area is easily accessed by Southern Eureka County residents and used particularly for camping and fishing. Between 2000 and 2009, fishing use on Roberts Creek and Tonkin Reservoir **averaged** 17 and 101 anglers per year, respectively, and each angler caught seven and 16 fish respectively.

Organized Events or Special Recreation Permits

In 2006, all but one special recreation permit were for hunting related outfitting and guiding permits in the study area. The other permit was approved for XP Rides to conduct a Pony Express Trail re-ride in June of that year. The re-ride has been an annual event, conducted in June in recent years. The permit involves a re-ride for the entire Pony Express National Historic Trail across a multi-state area. The number of participants within the study area is estimated to be approximately 45 people for each event.

It is estimated that there are one to five guided hunts within the study area every year, each involving two to 25 participants. Due to the fact that permits are issued either statewide or for multiple BLM districts, the number of guided hunts in the area is highly variable and has been factored into the dispersed use visitor statistics.

Hunting

There are a variety of hunting opportunities in the general region. Common species hunted include mule deer, pronghorn antelope (*Antilocarpa americana*), mountain lion (*Puma concolor*), greater sage-grouse, chukar (*Alectoris chukar*), cottontail (*Sylvilagus nuttallii*), quail (*Oreortyx pictus*), pigeon (*Columba livia*), mourning dove (*Zenaidura macroura*), and waterfowl. Bighorn sheep (*Ovis canadensis*) and elk (*Cervus canadensis*) are also hunted in portions of the study area. Public scoping comments for the Project expressed concern over continued access for hunting in or near the Project Area.

The NDOW regulates big game hunting through a quota system, and tags are sold for each big game species in the various hunt units. The study area includes all of Hunt Units 142, 143, 145 and all but a very small portion of Hunt Unit 144. The study area overlaps portions of Hunt Units 65, 155, 161, 162, 163, 164, 131, and 108. The big game status and trend for the Project Area are discussed in Section 3.24 (Wildlife and Fisheries Resources). The big game hunt statistics for the hunt units that are within or that overlap the study area are shown in Table 3.15-2. The hunt unit statistics presented in Table 3.15-1 reflect the average number of animals harvested in each unit. This is a result of the statistics being divided by multiple hunt unit groups provided in the NDOW data (NDOW 2010).

Table 3.15-2: 2010 Harvest by Hunt Unit and Group

Hunt Unit	Bighorn Sheep			Elk			Mule Deer			Pronghorn Antelope		
	Tags	Number of Success	Percent of Success	Tags	Number of Success	Percent of Success	Tags	Number of Success	Percent of Success	Tags	Number of Success	Percent of Success
Hunt Units within the Recreation Study Area												
142	0	0	0	0	0	0	378	157	59	34	25	71
143	0	0	0	0	0	0	378	157	49	85	59	40
144[1]	0	0	0	0	0	0	386	161	53	31	23	74
145	0	0	0	0	0	0	368	151	34	69	49	49
Hunt Units that Overlap the Recreation Study Area												
65	4	4	100	0	0	0	52	33	62	41	25	47
155	0	0	0	0	0	0	125	133	57	105	64	37
161	14	11	82	183	80	51	560	196	43	18	16	70

Hunt Unit	Bighorn Sheep			Elk			Mule Deer			Pronghorn Antelope		
	Tags	Number of Success	Percent of Success	Tags	Number of Success	Percent of Success	Tags	Number of Success	Percent of Success	Tags	Number of Success	Percent of Success
162	4	4	100	183	80	51	560	196	43	18	16	70
163	4	4	100	183	80	51	561	197	49	70	49	37
164	3	2	67	183	80	51	560	196	43	70	49	37
131	4	4	100	90	51	68	86	47	42	76	54	46
108	0	0	0	30	20	63	4,055	1,048	42	94	55	54

[1]A very small portion of the Hunt Unit is outside the Recreation Study Area boundary.
Source: NDOW 2009-2010 Big Game Status (NDOW 2010)

SCORP

The SCORP identified the ten most popular outdoor recreation activities in the Nevada market region, which includes Nevada, California, Oregon, Idaho, Utah, and Arizona. These activities included walking for pleasure, family gatherings, viewing/photographing natural scenery, visiting nature centers, gardening or landscaping, picnicking, sightseeing, driving for pleasure, viewing/photographing wildflowers, and visiting historic sites (Nevada Division of State Parks 2010). Respondents to the SCORP said that the five outdoor recreation areas and facilities that are most needed outside their local community were camping, fishing, parks, hiking, and biking. The SCORP also ranked and weighted the top eight outdoor recreation issues in Nevada. The number one issue identified was public access to public lands for diverse outdoor recreation (Nevada Division of State Parks 2010). Additionally, SCORP's strategies emphasize water-based recreational opportunities which are provided at Roberts Creek, Pete Hanson, and Tonkin Springs.

Local and County Recreation Facilities

Tourism and recreation attractions in southern Eureka County include hunting, sightseeing, off-road vehicle use, visits to the Eureka Opera House and Sentinel Museum, wild horse viewing, general interest in the historic mining character of the community, and events such as the county fair, the county youth fair, the high school rodeo and a series of horse shows, softball tournaments, and shooting and archery tournaments. Bicycle racers use the Town of Eureka for overnight stays.

In addition to the many available outdoor recreation opportunities available in southern Eureka County, Eureka County and the Eureka County School District (ECSD) provide a number of developed recreation facilities. The county provides a park in Eureka, which offers barbecue facilities, covered picnic tables, horseshoe pits and a children's playground. The county also provides two baseball diamonds and an indoor swimming pool in Eureka. The school district allows community use of an indoor gymnasium, football field, and a running track when these facilities are not being used for school events.

The Eureka County **Fairgrounds**, located on the **north end** of Eureka, provides a pavilion with a stage, a fair building, restrooms, concession stand, and large and small arenas (Eureka County 1996). This facility hosts events such as the county fair, the county youth fair, the high school rodeo, and a series of horse shows, softball tournaments, bicycle races and shooting and archery tournaments (Eureka County Economic Development Council 2006).

Of importance to the local community and visitors are Roberts Creek, Pete Hanson Creek, and Tonkin Reservoir, which are important parts of the recreational portfolio. These areas have been used as traditional and historic fishing areas for the residents of Eureka County and others, and provide important water-based recreational and fishing opportunities in areas within close proximity to residents.

3.15.2.2.2 Wilderness Study Areas

Roberts Mountain WSA

The Roberts Mountain WSA is located in the Roberts Mountains approximately 40 miles northwest of Eureka, Nevada (Figure 3.15.1). The WSA includes 15,090 acres of public land with no privately owned inholdings. The Roberts Mountain WSA is irregularly shaped and surrounded on the three sides by major valley systems. The WSA consists of rugged mountainous areas and contains three prominent peaks. The varied topography has led to a variety of vegetative communities in proximity to one another. Vegetation consists of willow, cottonwood, aspen, birch, and dogwood trees in the deep narrow canyons. Mountain mahogany trees and limber pine are found in isolated stands on the barren rock ridges. **The BLM recommends zero acres as suitable for wilderness designation.**

The Roberts Mountains are the type locality (the geologic point of first recognition for example) of the Roberts Mountains Thrust, which is a major geologic structure in western North America. The area has been referred to as "the Window of the World" because of the unique view it gives of the complex geologic structure of the region and has been studied by professional geologists and students from across the nation because of its rare qualities and geologic importance.

Simpson Park WSA

The Simpson Park WSA is located in the Simpson Park Mountain Range approximately 50 miles northwest of Eureka, Nevada. The WSA includes 49,670 acres of public land and surrounds two privately owned inholdings totaling 80 acres. The Simpson Park WSA consists of mountainous topography with scattered stands of aspen and mountain mahogany. The WSA is approximately 17 miles long and five miles wide. No special features of geological, ecological, scientific, educational, scenic, or historical value are known to exist in the Simpson Park WSA. **The BLM recommends zero acres as suitable for wilderness designation.**

3.15.3 Environmental Consequences and Mitigation Measures

3.15.3.1 Significance Criteria

The Proposed Action or alternatives would be considered to have a significant effect on the environment if the following would occur:

- Conflict with formally established recreational, educational, religious, or scientific uses of the area;
- Result in nonconformance with the Wilderness Act of 1964 or the BLM Interim Management Policy for Lands Under Wilderness Review;
- Substantially degrade or reduce the quantity or quality of the area available for existing or future recreational opportunities; or

- Result in the unmitigated loss of a unique recreational resource.

3.15.3.2 Assessment Methodology

The Proposed Action and alternatives were compared to the recreational planning information obtained from Eureka County, NDSP, and BLM to determine the potential for, and expected severity of, conflicts with existing and planned recreational uses. Potential effects on recreational resources can be categorized as short term (i.e., during the life of the Project) and long term. Short-term loss of recreation would occur in areas subject to surface disturbance and subsequent reclamation. Long-term loss of recreation would occur in areas that would not be reclaimed. The effects are determined to be significant or not significant based on the applicable significance criteria listed in Section 3.15.3.1.

3.15.3.3 Proposed Action

3.15.3.3.1 Short-Term Recreational Opportunities

Implementation of the Proposed Action would directly affect recreation through loss of public lands managed for multiple uses, including dispersed recreation, for the duration of the Project including reclamation (approximately 70 years) within the fenced portion of the Project Area. The portion of the Project Area that would not be accessible to the public, the 14,204 fenced acres that includes the main portion of the Project Area (open pit, WRDF, and TSFs) and the well heads and booster stations, is similar to the surrounding region and does not provide unique recreational opportunities for the area. This area would be reopened to the public as soon as the mine poses no safety risk following reclamation. The restoration of recreational opportunities within the Project Area would depend on the successful reclamation of the land. Large areas of open land outside the Project Area, but within the BLM's MLFO, are available for dispersed recreation. In a portion of central Nevada where most of the surrounding lands are open public lands, the fencing and restricted public use of the Project Area would not greatly limit recreational opportunities. However, those individuals that currently use the Project Area for recreational activities or hunting would be required to use other areas over the life of the Project.

- **Impact 3.15.3.3-1:** Public lands within the fenced portion of the Project Area (14,204 acres) potentially used for dispersed recreation would be removed from use in the short term as a result of the construction and operation of the Project.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.15.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.3.2 Long-Term Recreational Opportunities

Under the Proposed Action, 734 acres of the Project Area would be restricted from recreation in the long term for safety and security reasons through the installation of the berms and fencing. This area corresponds to the open pit.

- **Impact 3.15.3.3-2:** A total of 734 acres within the Project Area would be closed to public access and users in the long term.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.15.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.3.3 Regional Recreation Effects

The Proposed Action would result in an increased population in the local region and associated increase in demand for recreational opportunities. Dispersed and developed recreation areas would be impacted by increased use and demand.

- **Impact 3.15.3.3-3:** Public lands, developed recreation sites, and community recreation facilities would be impacted by increased use and demand.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.15.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.3.4 Wilderness Study Area Effects

The Proposed Action would have no direct impact on wilderness areas or WSAs. The Proposed Action conforms with the Wilderness Act of 1964 and the BLM's IMP for WSAs.

3.15.3.3.5 Indirect Effects

Potential indirect impacts to recreation could occur if ground water pumping activities decrease the flows in Roberts Creek. Decreased flows could limit fishing opportunities and the overall quality of the area for camping and general recreational activities. Other indirect impacts to recreation associated with the Proposed Action may result due to impacts to vegetation, wildlife, or visual resources. Potential impacts to these resources are analyzed in Sections 3.9, 3.24, and 3.7, respectively. Potential impacts and associated mitigation to flows in Roberts Creek are outlined in Section 3.2.

3.15.3.3.6 Residual Adverse Impacts

The Proposed Action would result in the unavoidable loss of up to 14,204 acres in the short term and an unavoidable and adverse loss of 734 acres in the long term of public land managed for multiple uses, including dispersed recreation, resulting from surface disturbance, and access to surrounding recreation areas would be restricted through a portion of the Project Area. As a result of the increased population in the area, there would be an increased demand for recreational areas and facilities; however, due to the proximity of similar public lands, the unavoidable potential impacts are considered less than significant. There would be no residual adverse impacts on wilderness or WSAs.

3.15.3.4 No Action Alternative

3.15.3.4.1 Short-Term Recreational Opportunities

Under the No Action Alternative, the proposed Project would not be developed and associated impacts to recreation would not occur; however, EML would continue to conduct mineral exploration and data acquisition within the Project Area. Ongoing reclamation would help to minimize impacts to recreation as a result of these activities. The area would remain available for future mineral development, recreational use, or for other purposes as approved by the BLM.

- **Impact 3.15.3.4-1:** Public lands potentially used for dispersed recreation adjacent to the mineral exploration and data acquisition areas would be removed from use for the duration of those activities.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.15.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.4.2 Residual Adverse Impacts

The No Action Alternative would result in the unavoidable loss of public land managed for multiple uses, including dispersed recreation, resulting from surface disturbance; however, the loss of recreational areas under this alternative would be minimal. There would be no residual adverse impacts on wilderness or WSAs.

3.15.3.5 Partial Backfill Alternative

3.15.3.5.1 Short-Term Recreational Opportunities

The Partial Backfill Alternative would involve the partial backfilling of the open pit to eliminate the pit lake and the floor of the open pit would be reclaimed with growth media and seeded. Although the Proposed Action would have 734 acres that would remain unvegetated in the open pit, under this alternative approximately 206 acres associated with the remaining open pit highwalls would remain unvegetated following Project completion and reclamation; however, impacts to recreation from this alternative would be the same as the Proposed Action since the fenced area around the Project would be the same.

- **Impact 3.15.3.5-1:** Public lands within the fenced portion of the Project Area (14,204 acres) potentially used for dispersed recreation would be removed from use in the short term as a result of the construction and operation of the Project.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.15.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.5.2 Long-Term Recreational Opportunities

Even though the open pit would be partially backfilled and the pit floor revegetated, the 734 acres of the open pit would be restricted from recreation in the long term for safety and security reasons, which is the same as under the Proposed Action.

- **Impact 3.15.3.5-2:** A total of 734 acres within the Project Area would be closed to public access and users in the long term through the installation of the berms and fencing.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.15.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.5.3 Regional Recreation Effects

The Partial Backfill Alternative would result in an increased population in the local region and associated increase in demand for recreational opportunities. Dispersed and developed recreation areas would be impacted by increased use and demand.

- **Impact 3.15.3.5-3:** Public lands, developed recreation sites, and community recreation facilities would be impacted by increased use and demand.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.15.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.5.4 Wilderness Study Area Effects

The Partial Backfill Alternative would have no direct impact on wilderness areas or WSAs. The Proposed Action conforms with the Wilderness Act of 1964 and the BLM's IMP for WSAs.

3.15.3.5.5 Indirect Effects

Potential indirect impacts to recreation could occur if ground water pumping activities decrease the flows in Roberts Creek. Decreased flows could limit fishing opportunities and the overall quality of the area for camping and general recreational activities. Indirect impacts to recreation associated with the Partial Backfill Alternative may result due to impacts to vegetation, wildlife, or visual resources. Potential impacts to these resources are analyzed in Sections 3.9, 3.24, and 3.7, respectively.

3.15.3.5.6 Residual Adverse Impacts

The Partial Backfill Alternative would result in the unavoidable loss of up to 14,204 acres in the short term and an unavoidable and adverse loss of 734 acres in the long term of public land managed for multiple uses, including dispersed recreation, resulting from surface disturbance,

and access to surrounding recreation areas would be restricted through a portion of the Project Area. There would be an increased demand for recreational areas and facilities; however, due to the proximity of similar public lands, the unavoidable potential impacts are considered less than significant. There would be no residual adverse impacts on wilderness or WSAs.

3.15.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

3.15.3.6.1 Short-Term Recreational Opportunities

Although the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in approximately 20 acres less surface disturbance compared to the Proposed Action, impacts to recreation from this alternative would be the same as the Proposed Action since the fenced area of the Project would be the same.

- **Impact 3.15.3.6-1:** Public lands within the fenced portion of the Project Area (14,204 acres) potentially used for dispersed recreation would be removed from use in the short term as a result of the construction and operation of the Project.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.15.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.6.2 Long-Term Recreational Opportunities

Under the Off-Site Transfer of Ore Concentrate for Processing Alternative, 734 acres of the Project Area would be restricted from recreation in the long term for safety and security reasons. This area corresponds to the open pit.

- **Impact 3.15.3.6-2:** A total of 734 acres within the Project Area would be closed to public access and users in the long term through the installation of the berms and fencing.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.15.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.6.3 Regional Recreation Effects

The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in an increased population in the local region and associated increase in demand for recreational opportunities. Dispersed and developed recreation areas would be impacted by increased use and demand.

- **Impact 3.15.3.6-3:** Public lands, developed recreation sites, and community recreation facilities would be impacted by increased use and demand.

Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.15.3.1.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.6.4 Wilderness Study Area Effects

The Off-Site Transfer of Ore Concentrate for Processing Alternative would have no direct impact on wilderness areas or WSAs. The Proposed Action conforms with the Wilderness Act of 1964 and the BLM's IMP for WSAs.

3.15.3.6.5 Indirect Effects

Potential indirect impacts to recreation could occur if ground water pumping activities decrease the flows in Roberts Creek. Decreased flows could limit fishing opportunities and the overall quality of the area for camping and general recreational activities. Indirect impacts to recreation associated with the Off-Site Transfer of Ore Concentrate for Processing Alternative may result due to impacts to vegetation, wildlife, or visual resources. Potential impacts to these resources are analyzed in Sections 3.9, 3.24, and 3.7, respectively.

3.15.3.6.6 Residual Adverse Impacts

The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the unavoidable loss of up to 14,204 acres in the short-term and an unavoidable and adverse loss of 734 acres in the long-term of public land managed for multiple uses, including dispersed recreation, resulting from surface disturbance, and access to surrounding recreation areas would be restricted through a portion of the Project Area. There would be an increased demand for recreational areas and facilities; however, due to the proximity of similar public lands, the unavoidable potential impacts are considered less than significant. There would be no residual adverse impacts on wilderness or WSAs.

3.15.3.7 Slower, Longer Project Alternative

Impacts to recreation from the Slower, Longer Project Alternative are expected to be similar to impacts from the Proposed Action at the end of the Project; however, impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action.

3.15.3.7.1 Short-Term Recreational Opportunities

- **Impact 3.15.3.7-1:** Public lands within the fenced portion of the Project Area (14,204 acres) potentially used for dispersed recreation would be removed from use in the short-term as a result of the construction and operation of the Project.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.7.2 Long-Term Recreational Opportunities

Under the Slower, Longer Project Alternative, 734 acres of the Project Area would be restricted from recreation in the long-term for safety and security reasons. This area corresponds to the open pit.

- **Impact 3.15.3.7-2:** A total of 734 acres within the Project Area would be closed to public access and users in the long-term.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.15.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.7.3 Regional Recreation Effects

The Slower, Longer Project Alternative would result in an increased population in the local region and associated increase in demand for recreational opportunities. Dispersed and developed recreation areas would be impacted by increased use and demand.

- **Impact 3.15.3.7-3:** Public lands, developed recreation sites, and community recreation facilities would be impacted by increased use and demand.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.15.3.1.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.15.3.7.4 Wilderness Study Area Effects

The Slower, Longer Project Alternative would have no direct impact on wilderness areas or WSAs. The Slower, Longer Project Alternative conforms with the Wilderness Act of 1964 and the BLM's IMP for WSAs.

3.15.3.7.5 Indirect Effects

Potential indirect impacts to recreation could occur if ground water pumping activities decrease the flows in Roberts Creek. Decreased flows could limit fishing opportunities and the overall quality of the area for camping and general recreational activities. Indirect impacts to recreation associated with the Slower, Longer Project Alternative may result due to impacts to vegetation, wildlife, or visual resources. Potential impacts to these resources are analyzed in Sections 3.9, 3.24, and 3.7, respectively.

3.15.3.7.6 Residual Adverse Impacts

The Slower, Longer Project Alternative would result in the unavoidable loss of up to 14,204 acres in the short-term and an unavoidable and adverse loss of 734 acres in the long-term

of public land managed for multiple uses, including dispersed recreation, resulting from surface disturbance, and access to surrounding recreation areas would be restricted through a portion of the Project Area. There would be an increased demand for recreational areas and facilities; however, due to the proximity of similar public lands, the unavoidable potential impacts are considered less than significant. There would be no residual adverse impacts on wilderness or WSAs.

3.16 Auditory Resources

3.16.1 Regulatory Framework

The State of Nevada and Eureka County do not have auditory resources criteria or standards for evaluating auditory resource impacts associated with mining operations; therefore, auditory resource impacts would be evaluated in this document according to the estimated degree of disturbance to the nearest sensitive receptor sites. The BLM and the NPS do not have auditory criteria or standards.

3.16.2 Affected Environment

This section explains the terminology used to describe sound levels and auditory resources, as well as the existing noise conditions at selected locations near the Project. Hearing a sound occurs when rapid variations in air pressure are stimulating or moving the ear drum (tympanic membrane), and this mechanical movement, in turn, stimulates various components of the peripheral and central auditory system. Noise is a sound which is unwanted or not desired and which may disrupt human activities **and wildlife**. Air pressure variations are measured as the change in sound pressure exerted on the diaphragm of a microphone attached to a sound level meter.

Sound is measured in units of decibels (dB) and for environmental purposes usually is measured in units of decibels A-weighted (dBA). A-weighting refers to an electronic technique which simulates the relative response of the human auditory system to the various frequencies comprising all sounds. The sound levels are described in units of dBA, unless stated otherwise. The sound measurement scale is not linear, it is logarithmic. A logarithmic scale is used because sound levels can span over a very large range and the logarithmic scale permits use of relatively small numbers. For example, sound pressures of approximately 115 dBA are not uncommon in nightclubs or near loudspeakers at rock concerts. A sound pressure at 115 dBA is equal to 10,000,000 micropascals. In contrast, zero dBA is the threshold of human hearing, which is equivalent to 20 micropascals. Thus, a range of approximately ten million pressure units can be described with only 115 dB units. This range is specific to this example, but sound pressure levels of 140 dBA and above have been recorded near rocket engines.

Logarithmic scales cannot be added arithmetically. For example, one sound at 80 dB plus another sound at 80 dB would not equal 160 dB. The combined 80 dB sounds would result in a total sound level of approximately 83 dB because sound is measured on a logarithmic scale. The combined total sound level from two sources is only 40.3 dBA if one sound is at 40 dBA and the second sound is at 29 dBA. The following are rules that may be helpful in understanding this analysis:

- In general, one sound must be at least three dB louder than another sound for people to reliably determine that one sound source is louder than a second source; and
- A sound that is approximately ten dB louder than a second sound would be perceived as being about twice as loud as the second sound.

Federal recommendations for acceptable noise levels at residential receivers are generally in the range of 55 dB L_{dn} to 65 dB L_{dn} (L_{dn} = level day/night), based upon the recommendations contained in the EPA "Levels Document" (1974) and upon the 65 dB L_{dn} criterion applied by the U.S. Department of Housing and Urban Development and other federal agencies. These criteria are typically applied to noise from transportation noise sources, but may be used to assess the compatibility of other noise sources relative to residential land uses, provided that consideration is given to potential disturbances due to impulsive sound, tonal content (whistles, music, etc.), and the prevalence of nighttime activities.

For other noise sources, especially those that may occur over short periods of the day or night, it is common to apply noise criteria based upon hourly noise levels, making a distinction between noise levels produced during daytime and nighttime hours. Acceptable hourly noise levels in residential areas are usually considered to be in the range of 50 to 55 dB (average) during daytime hours and 45 to 50 dB (average) during nighttime hours; the lower noise level limits would be appropriate in areas that currently have low ambient noise levels. Hourly noise standards are usually expressed in terms of average (L_{eq}) or median (L_{50}) noise levels, and they often are corrected for the presence of impulsive sounds and tonal content.

Table 3.16-1 shows the approximate sound levels associated with various common sources. Note that the range of sound levels is 75 dBA (from 25 to 100 dBA) and ranges between the very quiet (rustling leaves) to a loud auto horn. The measured sound level decreases with increasing distance between a sound source and the sound-measuring device or the listener. Distances are specified for some sources in Table 3.16-1.

Table 3.16-1: Relative Scale of Various Noise Sources

Noise Level (dBA)[a]	Common Indoor Noise Levels	Common Outdoor Noise Levels
110	Rock band	--
105	--	Jet flyover at 1,000 feet
100	Inside New York subway train	--
95	--	Gas lawn mower at 3 feet
90	Food blender at 3 feet	--
80	Garbage disposal at 3 feet, or shouting at 3 feet	Noisy urban daytime
70	Vacuum cleaner at 10 feet	Gas lawn mower at 100 feet
65	Normal speech at 3 feet	Commercial area, heavy traffic at 300 feet
60	Large business office	--
50	Dishwasher in next room	Quiet urban daytime
40	Small theater, large conference room	Quiet urban nighttime
35	--	Quiet suburban nighttime
33	Library	--

Noise Level (dBA)[a]	Common Indoor Noise Levels	Common Outdoor Noise Levels
28	Bedroom at night	--
25	Concert hall (background)	Quiet rural nighttime
15	Broadcast and recording studio	--
5	Threshold of hearing	--

[a] A-weighted decibel sound scale.

At relatively high levels, noise can be a nuisance because it may interfere with daytime activities such as hearing and understanding speech, it may disrupt sleep, or more generally degrade the quality of life; however, there is no simple answer to the question of "how much noise is too much?" In part, the answer depends on the loudness of the noise relative to ambient or background noise level, when it occurs, what the listener is doing, what the noise source is, and the listener's attitude toward the source. Nonetheless, some reasonably accurate estimates of how communities of people may respond to noise can be made based on measurements and predictions of the A-weighted noise levels expected at some locations. These estimates are based on a fairly large number of scientific studies of community responses to noise at many average noise levels from a wide variety of noise sources (Harris 1991; Kryter 1985; and May 1978). The studies and empirically validated techniques for estimating (predicting) noise levels at receptors (Edison Electric Institute 1984) are used in predicting and evaluating noise effects on humans.

3.16.2.1 Study Methods

The Project noise impact analysis for the Project applied measured noise levels and frequency content of representative noise sources to the Environmental Noise Model (ENM). The ENM is a commercially-available noise propagation model that accepts input of noise levels and frequency content for a number of sources, located on an appropriate base map. In this case, a generalized model was used that assumed a level ground situation, and thus the modeling did not account for topography in the Project Area which results in a more conservative analysis. The ENM predicts noise propagation in terms of noise levels at selected receivers, or in terms of noise contours, accounting for the effects of atmospheric and ground absorption of sound.

Noise level data for the sources expected to be used at the Project were obtained from noise measurements conducted by Brown-Buntin Associates, Inc. (BBA) at aggregate and asphalt plants in California and Nevada.

The equipment used for most of the noise measurements was a Larson Davis Model 824 precision integrating sound level meter and frequency analyzer fitted with a Larson Davis Model 2541 free-field microphone, meeting the specifications of the American National Standards Institute (ANSI) for Type 1 sound measurement systems. The noise measurement system was calibrated before use with a Larson Davis Model CA-250 acoustical calibrator certified by its manufacturer to be consistent with reference values maintained by the National Bureau of Standards.

To prepare the data for use in the ENM, the measured noise levels were entered into the ENM in terms of octave band sound pressure levels, referring to the measurement distance. The ENM was then calibrated for each source to predict the same values as were measured in the field. For most noise sources, the data were entered as hourly equivalent noise levels (L_{eq}). For sound sources that were not continuous in nature, such as passing trucks, the data were entered as

Sound Exposure levels (SEL), and adjustments were made to derive the L_{eq} based upon the projected numbers of operations per hour at the Project.

The noise sources were placed on the ENM base map at representative heights above the ground surface, based upon the equipment observed at similar project sites. The receiver sites selected for this analysis generally describe the nearest residential areas or sites of potential concern. Ambient noise levels were assigned to each site based upon the noise measurement results obtained at the nearest ambient noise monitoring sites. This method allows comparison of predicted Project-related and representative ambient noise levels.

The ENM accounts for atmospheric absorption of sound, considering the factors of temperature, relative humidity, and absorption of sound by the ground. The noise level predictions made for this Project assume a uniform atmosphere with no wind. It is recognized that variations in atmospheric conditions may cause the actual Project noise levels to be either higher or lower than predicted by the ENM.

The effects of changes in temperature and humidity upon sound propagation are generally slight, so that variations in predicted noise levels within the range of temperature and relative humidity found in the Project Area would not be substantial.

Winds can affect sound propagation, generally by increasing noise levels downwind, and decreasing noise levels upwind; however, wind effects are difficult to predict reliably, as the range of wind speeds and directions experienced during even one night can be quite broad.

In the noise modeling process, the mining noise sources (power shovel, bulldozers, excavator, trucks and loaders) were placed in the approximate center of the assumed mining area. The processing equipment was placed on the base map as shown by the operations plan. The modeling assumed a flat earth scenario, where all equipment was placed at appropriate heights above the existing grade, and where no topographic shielding (by topography or excavations) was present.

It is recognized that the mining equipment may be placed at any point in the mining area, and would therefore be either closer to, or farther from, any given sensitive receiver location at different times during the mine development. As a result, the predicted noise levels would increase or decrease as a function of distance. Similarly, the equipment may be placed closer to, or farther from, the sides of the excavation, which would either enhance or reduce the insertion loss (shielding) and consequent noise level reduction provided by topographic barriers. Preparation of detailed noise models for all possible configurations of mining is clearly impractical.

The noise modeling assumptions provide a generalized depiction of mining and milling facility noise levels, based upon the available source noise emission data. The modeled noise levels provide a conservative basis for judging the likely noise impacts of this Project.

In addition to the analysis using the ENM, there are qualitative issues related to auditory effects. These include the consistency and duration of the noise.

The closest noise-sensitive receptors where noise from the existing and proposed operations is or could be heard are assessed in this section. These receptors include the following:

- Alpha Ranch;
- Roberts Creek Ranch;
- Risi Ranch; **and**
- Diamond Valley residences.

3.16.2.2 Existing Conditions

Ambient noise levels were collected at the Alpha and Roberts Creek Ranches and the results are listed in Table 3.16-2. The ambient noise levels were very low at 20 and 21 dB, respectively. The noise levels are typical of isolated desert areas. Other locations, such as the Risi Ranch or the Diamond Valley residences which are a similar distance from the Project Area would likely have similar or higher ambient noise levels due to the traffic traversing SR 278, U.S. Highway 50, and other roads in the area.

Table 3.16-2: Bases for Ambient Hourly Noise Level Assumptions

Receiver	Description	Ambient L_{50}, dB	Date of Ambient Measurements	Time Period
1	Alpha Ranch	21	September 10, 2007	0800-1200
2	Roberts Creek Ranch	20	September 11, 2007	0800-1200

3.16.3 Environmental Consequences and Mitigation Measures

3.16.3.1 Significance Criteria

Noise impacts from mining would be considered significant if the Proposed Action would result in noise levels in excess of 55 dBA, as measured outside the Project Area at a sensitive receptor site. Noise impacts from blasting would be considered significant if the Proposed Action resulted in the following:

- Maximum noise levels in excess of 70 dBA measured at a sensitive receptor site;
- Ground vibration as a result of blasting that could initiate or extend observable cosmetic cracking of structures at a sensitive receptor site;
- **Flyrock from blasting results in property damage or human injury outside the Project fence;** or
- A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project.

3.16.3.2 Assessment Methodology

Noise impacts were evaluated according to the estimated degree of disturbance to the nearest sensitive receptor sites. **Impacts to wildlife are discussed in Section 3.23.3.**

3.16.3.3 Proposed Action

Noise levels associated with the Project would be related to mining and construction operations and blasting activities. The ENM was run to predict hourly noise levels assuming that the mining and processing equipment was in continuous use.

The ambient noise level data for Alpha and Roberts Creek Ranches listed in Table 3.16-2 were carefully reviewed to select conservative bases for comparison to the relatively steady-state noise

levels produced by the proposed mining operation (as perceived at a distance). For this purpose, the "ambient noise level" was assumed to be represented by the measured hourly median noise levels (L_{50}) at the quietest part of the day.

The assumed ambient noise level was the arithmetic average of the hourly median noise levels of the quietest contiguous four-hour period of the quietest day. This describes the noise level experienced during the quietest time of the day. Table 3.16-3 lists the measurement locations and time periods used to establish the "quiet hours" ambient noise levels for the noise impact analysis, and the dominant noise sources at each location.

Table 3.16-3 lists the predicted average Project-related noise levels at each of the selected noise receptor monitoring location, and provides a comparison to the measured ambient hourly noise levels described by Table 3.16-2.

For assessment of noise levels in terms of the L_{dn}, it was necessary to make certain assumptions about the hours of operation for the Project. For this analysis, it was assumed that the Project would be in operation 24 hours on any given day. Given this assumption, the L_{dn} values would be 6.4 dB higher than the L_{eq} values shown by Table 3.16-3. Similarly, 6.4 dB should be added to the L_{eq} noise contours, so that, for example, the 45 dB L_{eq} contour represents 51.4 dB L_{dn}.

Table 3.16-3: Comparison of Predicted and Ambient Hourly Noise Levels

Receiver	Description	Project L_{eq}, dB	Ambient L_{50}, dB	Project + Ambient, dB	Change, dB
1	Alpha Ranch	<10	21	21	0
2	Roberts Creek Ranch	13	20	21	1

The ambient L_{dn} value was the energy-average of the daily L_{dn} values observed during the continuous noise measurement periods. Table 3.16-4 lists the predicted L_{dn} values for the Project operations and provides a comparison to the average measured ambient L_{dn} values.

Table 3.16-4: Comparison of Predicted and Ambient Day-Night Levels

Receiver	Description	Project L_{eq}, dB	Ambient L_{50}, dB	Project + Ambient, dB	Change, dB
1	Alpha Ranch	16	43.8	43.8	0
2	Roberts Creek Ranch	19	43.7	45.7	2

3.16.3.3.1 Noise Associated with the Water System Booster Station

The water for the mine would be pumped from wells using submersible pumps, which are typically inaudible at the ground surface. The water would then be pumped to the mine site using a booster station, which would have four 600-**Horsepower** (Hp) pump motors. These pumps would be above ground. Based upon accepted engineering methods, the noise level of a single pump would be about 96 dBA at a distance of three feet. A group of four pumps could produce a noise level as high as 55 dBA at a distance of 2,000 feet and 40 dBA at a distance of 3,000 feet. The booster pump station would be located at the north end of the Kobeh Valley, greater than 2,000 and 5,000 feet from the nearest sensitive receptors, greater sage-grouse leks and Roberts Creek Ranch, respectively (Figure 2.1.7).

3.16.3.3.2 Traffic Noise

Traffic noise from SR 278 is an existing noise source in the Project Area. Noise levels due to Project-related traffic on SR 278 were predicted using the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108).

For the traffic noise impact analysis, it was assumed that a representative noise exposure would occur at a reference distance of 50 feet from the centerline of SR 278, which roughly corresponds to the nearest possible residential receivers. The ADT volume for year 2006 with the addition of construction traffic is predicted to be 313 vehicles north of the Project Area and 797 vehicles south of the Project Area. Assuming normal mining operations, the ADT volume is predicted to be 316 vehicles north of the Project Area and 700 vehicles south of the Project Area. Truck mix was adjusted to match the predicted ADT volumes for heavy trucks during construction and operational conditions. Day-night distribution of traffic noise was again assumed to be 87 percent (day) and 13 percent (night). Average vehicle speed was assumed to be 65 mph.

Table 3.16-5 lists the traffic noise modeling results for the year 2006 with the Project during construction and operational phases in terms of the L_{dn}. Table 3.16-6 shows reference noise emission levels and usage factors for construction equipment.

Table 3.16-5: State Route 278 Traffic Noise Levels Project Conditions

Positions Relative to Project Area	Predicted L_{dn}, dB, at 50 feet from Centerline				Distances from Centerline to L_{dn} Contours, feet		
	Autos	Medium Trucks	Heavy Trucks	Total	60 dB	65dB	70dB
Construction Phase							
North	54.5	51.5	53.4	58.1	37	17	8
South	58.7	55.5	56.0	61.7	65	30	14
Operations Phase							
North	54.1	52.3	56.1	59.2	44	21	10
South	58.1	54.5	56.2	61.3	61	28	13

Table 3.16-6: Reference Noise Emission Levels and Usage Factors for Construction Equipment

Equipment Description	Impact Device ?	Typical Use Factor %	Predicted L_{max} @ 50 ft (dBA, slow)	Average Measured L_{max} @ 50 ft (dBA, slow)	No. of Data Samples
All Other Equipment> 5 Hp	No	50	85	- - NA - -	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Boring Jack Power Unit	No	50	80	83	1
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Mixer Truck	No	40	85	79	40

Equipment Description	Impact Device ?	Typical Use Factor %	Predicted L_{max} @ 50 ft (dBA, slow)	Average Measured L_{max} @ 50 ft (dBA, slow)	No. of Data Samples
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25**Kilo Volt Amperes**, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader 19	No	40	85	- - NA - -	0
Horizontal Boring Hydraulic Jack	No	25	80	82	6
Jackhammer	Yes	20	85	89	133
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarifier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Tractor	No	40	84	- - NA - -	0
Ventilation Fan	No	100	85	79	13
Warning Horn	No	5	85	83	12
Welder / Torch	No	40	73	74	5

Source: FHWA Roadway Construction Noise Model, February 15, 2006

3.16.3.3.3 Construction Noise

Construction of the open pit and processing facilities would require use of a variety of engine-powered equipment on the site. Construction is expected to occur over a period of 18 to 20 months. In the first two months, it is anticipated that construction would occur on a 24-hour basis. The remaining construction would occur during daylight hours (7 a.m. to 6 p.m.), but could occur at night during the last four months of construction.

The noise levels associated with typical construction equipment are shown in Table 3.16-6. During the construction phase of the Project, noise from construction equipment would dominate the noise environment in the immediate area.

Maximum noise levels from different types of equipment under different operating conditions could range from 70 dB to 90 dB at a distance of 50 feet. The actual noise effects at any given

sensitive receiver location near the Project Area would be the result of a series of construction tasks. For example, bulldozers would rough out the roadway and building pads. Bulldozers and loaders would move the loose materials to haul trucks, which would either leave the site or transfer materials to areas needing fill. Scrapers and graders would level the site. Other equipment would deliver and install materials and utilities. Compressors and generators could be used at any time.

3.16.3.3.4 Blasting Noise

Blasting would be conducted to break up the rock for hauling and processing. Although blasts are perceived to be one large explosion, mining blasts are actually a series of smaller, single-hole explosions. Each hole is sequentially delayed and detonated independently of the other holes. Less noise and ground vibrations are generated because several small blasts (delays) are detonated in sequence rather than as one large instantaneous blast. Blasting can be further controlled by varying the amount of explosive, the type of delay, the delay sequence, and the type of explosives. In general, blasting is controlled to minimize dispersal of the rock fragments, and to ensure the safety of the workers. Blasting is also controlled to prevent damage to nearby structures, including any on-site construction trailers.

Airborne overpressures produced by blasting are typically measured in terms of the overall peak sound pressure level, without applying the A-weighting filter. The dominant frequencies of sound pressures associated with blasting lie in the low frequency range of 2 Hz to 25 Hz, and the acoustical energy is concentrated below approximately five Hz. Audible sound, in contrast, is usually assumed to begin at 20 Hz, ranging up to 20,000 Hz. People hear best at frequencies in the range of 1,000 Hz to 4,000 Hz, and people hear poorly at the low frequencies associated with blast overpressures.

The A-weighting adjustment factor for sound at 25 Hz (the upper limit of the dominant blast frequencies) is -44.7 dB. There are no published A-weighting correction factors below 12.5 Hz (where the A-weighting correction factor is -63.4 dB). These factors indicate that very high blast overpressures would be required to generate sound pressure levels that would be audible in an outdoor environment.

Assuming that the Project is designed so that a **designed maximum** blast would not exceed 0.01 psi, and that all the energy of a blast would be concentrated at 25 Hz, the highest possible peak A-weighted sound pressure level due to a blast at the property line would be 65 dB, and the maximum noise level would likely be in the range of 55 to 60 dB. The maximum sound pressure level is lower than the peak level because peak and maximum levels are measured differently.

Blasting noise levels are difficult to predict in terms of A-weighted sound pressure levels because of their frequency content and brief duration. No noise propagation models are known to exist to predict the audible noise due to blasting; the ENM does not predict sound propagation for frequencies below 25 Hz.

Blasting takes place only during daylight hours and is conducted under strict MSHA safety procedures. As the open pit increases in depth, the noise from blasting is increasingly reflected upward by the open pit walls, thus further reducing the noise level.

- **Impact 3.16.3.3-1:** Ambient noise levels associated with the Proposed Action could be increased and affect ambient noise levels at the nearest ranch houses and residences.

  Significance of the Impact: The predicted changes in hourly ambient noise levels at the nearest ranch houses are 1 dB or less. The impact would be similar at the residences in Diamond Valley because of the similar distances from the Project activities. This impact would be considered less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.3-2:** Project-related noise levels associated with the Proposed Action could be increased to noise levels that would be less than 55 dBA as measured at a sensitive receptor site.

  Significance of the Impact: The impact would be considered less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.3-3:** The Proposed Action would cause increases in traffic noise levels.

  Significance of the Impact: The predicted changes in traffic noise levels are less than 3 dB where the existing traffic noise level exceeds 60 dB L_{dn}; therefore, the predicted changes in traffic noise levels due to the Proposed Action would be less than significant. The predicted Project-related mining and processing noise level in the vicinity of the Project access road and SR 278 is approximately 39 dB L_{dn}. This level of noise would not cause a significant change in ambient noise levels at that location in terms of L_{dn}, since the existing traffic noise would be nearly 20 dB higher than the mining and processing noise level.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.3-4:** The Proposed Action would cause increases in noise levels that could impact local residences through construction activities or poorly maintained construction equipment. The maximum noise levels received at the nearest ranch house, which is approximately two miles away from the nearest areas where grading would occur, would be reduced by approximately 23 dB as compared to the values shown on Table 3.16-6, ignoring sound absorption or any shielding provided by topography; therefore, maximum construction noise levels at the nearest ranch house would be in the range of approximately 47 to 67 dB. In practice, considering the topography of the Project Area, much of the construction equipment would be shielded from view of the nearest ranch house by topography. In those cases, the construction noise levels would be further reduced by 5 to 10 dB or greater.

  Significance of the Impact: Noise levels produced by construction activities or poorly maintained construction equipment in the vicinity of the Roberts Creek Ranch house

could be significant if such activities occurred at nighttime or if the noise level exceeds 55 dB.

- **Mitigation Measure 3.16.3.3-4:** Construction in the vicinity of the Roberts Creek Ranch house and greater sage-grouse leks would be limited to daylight hours and **would be limited during lekking periods (see Appendix D, Attachment 3)**. Construction equipment used in the vicinity of residences would be fitted with the best available technology manufacturers' noise control equipment, including engine exhaust silencers and acoustical enclosures. Noise control equipment would be maintained in good working order. Implementation of this mitigation measure would result in a less than significant impact.

- **Effectiveness of Mitigation and Residual Effects:** The implementation of this mitigation measure would be effective at reducing the potential impact to less than significant by controlling the generation of the noise.

- **Impact 3.16.3.3-5:** Noise caused by blasting during construction and mining could cause annoyance if residents were startled by unexpected blasts, or if blasting overpressures caused rattling of residence windows. The Proposed Action would not otherwise impact auditory resources associated with blasting.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Blasting would result in flyrock that could travel beyond the Project fence. The potential for this to occur would be minimized by proper blast design which would include the following: understanding the geology and material blasted; the appropriate development of a blast pattern; understanding the burden, depth, diameter, and angle of the blast holes; appropriate delay systems, powder factors, and pounds per delay; the type and amount of explosive material; and the type and amount of stemming.

- **Impact 3.16.3.3-6: The Proposed Action could generate flyrock. However, Project design would limit the potential for flyrock to travel beyond the Project fence.**

  Significance of the Impact: This impact would not be considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.16.3.3.5 Residual Adverse Impacts

There are no residual adverse impacts associated with the Proposed Action because noise would cease once the Project activities terminate.

3.16.3.4 No Action Alternative

Under the No Action Alternative, EML would not be authorized to develop the Mount Hope Project and mine the Mount Hope ore body as currently defined under the Proposed Action. The No Action Alternative would result from the BLM disallowing the activities proposed under the Plan (EML 2006); however, EML would be able to continue exploration activities as outlined in previously submitted Notices. Refer to Section 1.3 for a discussion of the existing Notice level activities. The area would remain available for future mineral development or for other purposes as approved by the BLM.

3.16.3.4.1 Noise Impacts

Under the No Action Alternative, none of the impacts associated with the Proposed Action would occur. Any noise generated by exploration activities under Notice-level activities would be below the level of significance.

3.16.3.4.2 Residual Adverse Impacts

Under the No Action Alternative there would be no residual adverse impacts.

3.16.3.5 Partial Backfill Alternative

Under this alternative, the Proposed Action would be developed and have the same surface disturbance footprint; however, at the end of the mining in the open pit, the open pit would be partially backfilled to eliminate the potential for a pit lake. The open pit would be backfilled to an elevation that varies from northwest to southeast across the open pit from approximately 7,300 to 6,850 feet amsl. The backfilling would commence in year 32 and be completed in approximately 13 years. The partial backfilling would be accomplished by the same fleet and personnel that completed the mining.

3.16.3.5.1 Noise Impacts

The noise related impacts under the Partial Backfill Alternative would be similar to that described for the Proposed Action, except that the duration of the mining related noise would last for 13 years longer. The Partial Backfill Alternative requires that a portion of the waste rock removed during mining be dumped back into the open pit to the point that would eliminate the potential for a pit lake. The equipment required for moving and dumping waste rock would remain on site longer than under the Proposed Action.

- **Impact 3.16.3.5-1:** Ambient noise levels associated with the Partial Backfill Alternative could be increased and affect ambient noise levels at the nearest ranch houses or residences.

  Significance of the Impact: The predicted changes in hourly ambient noise levels at the nearest ranch houses are 1 dB or less. The impact would be similar at the residences in Diamond Valley. This impact would be considered less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.5-2:** Project-related noise levels associated with the Partial Backfill Alternative could be increased to noise levels that are less than 55 dBA as measured at a sensitive receptor site.

  Significance of the Impact: The impact would be considered less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.5-3:** The Partial Backfill Alternative would cause increases in traffic noise levels.

  Significance of the Impact: The predicted changes in traffic noise levels are less than 3 dB where the existing traffic noise level exceeds 60 dB L_{dn}; therefore, the predicted changes in traffic noise levels due to the Partial Backfill Alternative would be less than significant. The predicted Project-related mining and processing noise level in the vicinity of the Project access road and SR 278 is approximately 39 dB L_{dn}. This level of noise would not cause a significant change in ambient noise levels at that location in terms of L_{dn}, since the existing traffic noise would be nearly 20 dB higher than the mining and processing noise level.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.5-4:** The Partial Backfill Alternative would cause increases in noise levels that could impact local residences through construction activities or poorly maintained construction equipment. The maximum noise levels received at the nearest ranch house, which is approximately two miles away from the nearest areas where grading would occur, would be reduced by approximately 23 dB as compared to the values shown on Table 3.16-6, ignoring sound absorption or any shielding provided by topography; therefore, maximum construction noise levels at the nearest ranch house would be in the range of approximately 47 to 67 dB. In practice, considering the topography of the Project Area, much of the construction equipment would be shielded from view of the nearest ranch house by topography. In those cases, the construction noise levels would be further reduced by five to 10 dB or greater.

  Significance of the Impact: Noise levels produced by construction activities or poorly maintained construction equipment in the vicinity of the Roberts Creek Ranch house could be significant if such activities occurred at nighttime or if the noise level exceeds 55 dB.

- **Mitigation Measure 3.16.3.5-4:** Construction in the vicinity of the Roberts Creek Ranch house or greater sage-grouse leks would be limited to daylight hours and **would be limited during lekking periods (see Appendix D, Attachment 3)**. Construction equipment used in the vicinity of residences would be fitted with the best available technology manufacturers' noise control equipment, including engine exhaust silencers and acoustical enclosures. Noise control equipment would be maintained in good working order.

- **Effectiveness of Mitigation and Residual Effects:** The implementation of this mitigation measure would be effective at reducing the potential impact to less than significant by controlling the generation of the noise.

- **Impact 3.16.3.5-5:** Noise caused by blasting during construction and mining could cause annoyance if residents were startled by unexpected blasts, or if blasting overpressures caused rattling of residence windows. The Partial Backfill Alternative would not otherwise impact auditory resources associated with blasting.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.5-6: The Proposed Action could generate flyrock. However, Project design would limit the potential for flyrock to travel beyond the Project fence.**

  Significance of the Impact: This impact would not be considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.16.3.5.2 Residual Adverse Impacts

There are no residual adverse impacts associated with the Partial Backfill Alternative.

3.16.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Under this alternative, the open pit, WRDFs, and TSFs would be developed as outlined under the Proposed Action; however, the ore processing facilities would include only the milling operations and production of the molybdenum sulfide concentrate. The TMO and FeMo portions of the processing facility would not be constructed, and as a result, the surface disturbance footprint would be approximately 20 acres less than under the Proposed Action. In addition, the leaching of the concentrate would likely not be done on site. The production of molybdenum sulfide concentrate would occur at an average rate of approximately 45.8 million pounds per year. This material would be stored at the Project Area in a concentrate storage structure adjacent to the mill. The molybdenum sulfide concentrate would be loaded from this storage facility into street-legal haul trucks with covered containers and transported on the public transportation system to either an existing or new TMO facility.

3.16.3.6.1 Noise Impacts

The noise related impacts under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be similar to but less than the Proposed Action. There would be less noise from the processing facilities because of the elimination of the roaster portion of the process; however, all the other noise levels would be the same since there would be a similar number of trucks hauling ore concentrate under this alternative, versus trucks hauling TMO under the Proposed Action.

- **Impact 3.16.3.6-1:** Ambient noise levels associated with the Off-Site Transfer of Ore Concentrate for Processing Alternative could be increased and affect ambient noise levels at the nearest ranch houses or residences.

  Significance of the Impact: The predicted changes in hourly ambient noise levels at the nearest ranch houses are 1 dB or less. The impact would be similar at the residences in Diamond Valley. This impact would be considered less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.6-2:** Project-related noise levels associated with the Off-Site Transfer of Ore Concentrate for Processing Alternative could be increased to noise levels to less than 55 dBA as measured at a sensitive receptor site.

  Significance of the Impact: The impact would be considered less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.6-3:** The Off-Site Transfer of Ore Concentrate for Processing Alternative would cause increases in traffic noise levels.

  Significance of the Impact: The predicted changes in traffic noise levels are less than 3 dB where the existing traffic noise level exceeds 60 dB L_{dn}; therefore, the predicted changes in traffic noise levels due to the Off-Site Transfer of Ore Concentrate for Processing Alternative would be less than significant. The predicted Project-related mining and processing noise level in the vicinity of the Project access road and SR 278 is approximately 39 dB L_{dn}. This level of noise would not cause a significant change in ambient noise levels at that location in terms of L_{dn}, since the existing traffic noise would be nearly 20 dB higher than the mining and processing noise level.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.6-4:** The Off-Site Transfer of Ore Concentrate for Processing Alternative would cause increases in noise levels that could impact local residences through construction activities or poorly maintained construction equipment. The maximum noise levels received at the nearest ranch house, which is approximately two miles away from the nearest areas where grading would occur, would be reduced by approximately 23 dB as compared to the values shown on Table 3.16-6, ignoring sound absorption or any shielding provided by topography; therefore, maximum construction noise levels at the nearest ranch house would be in the range of approximately 47 to 67 dB. In practice, considering the topography of the Project Area, much of the construction equipment would be shielded from view of the nearest ranch house by topography. In those cases, the construction noise levels would be further reduced by five to 10 dB or greater.

  Significance of the Impact: Noise levels produced by construction activities or poorly maintained construction equipment in the vicinity of the Roberts Creek Ranch house

could be significant if such activities occurred at nighttime or if the noise level exceeds 55 dB.

- **Mitigation Measure 3.16.3.6-4:** Construction in the vicinity of the Roberts Creek Ranch house or greater sage-grouse leks would be limited to daylight hours and **would be limited during lekking periods (see Appendix D, Attachment 3)**. Construction equipment used in the vicinity of residences would be fitted with the best available technology manufacturers' noise control equipment, including engine exhaust silencers and acoustical enclosures. Noise control equipment would be maintained in good working order. **Implementation of this mitigation measure would result in a less than significant impact.**

- **Effectiveness of Mitigation and Residual Effects:** The implementation of this mitigation measure would be effective at reducing the potential impact to less than significant by controlling the generation of the noise.

- **Impact 3.16.3.6-5:** Noise caused by blasting during construction and mining could cause annoyance if residents were startled by unexpected blasts, or if blasting overpressures caused rattling of residence windows. The Off-Site Transfer of Ore Concentrate for Processing Alternative would not otherwise impact auditory resources associated with blasting.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.6-6: The Proposed Action could generate flyrock. However, Project design would limit the potential for flyrock to travel beyond the Project fence.**

  Significance of the Impact: This impact would not be considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.16.3.6.2 Residual Adverse Impacts

There are no residual adverse impacts from noise as a result of the Off-Site Transfer of Ore Concentrate for Processing Alternative.

3.16.3.7 Slower, Longer Project Alternative

Impacts to auditory resources as a result of the Slower, Longer Project Alternative are expected to be similar to those described for the Proposed Action because of the same noise-making activities and the similar noise generation by those activities.

3.16.3.7.1 Noise Impacts

- **Impact 3.16.3.7-1:** Ambient noise levels associated with the Slower, Longer Project Alternative could be increased and affect ambient noise levels at the nearest ranch houses.

  Significance of the Impact: The predicted changes in hourly ambient noise levels at the nearest ranch houses are 1 dB or less and would be considered less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.7-2:** Project-related noise levels associated with the Slower, Longer Project Alternative could be increased to noise levels in excess of 55 dBA measured at a sensitive receptor site.

  Significance of the Impact: The impact would be considered less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.7-3:** The Slower, Longer Project Alternative would cause increases in traffic noise levels.

  Significance of the Impact: The predicted changes in traffic noise levels are less than 3 dB where the existing traffic noise level exceeds 60 dB L_{dn}; therefore, the predicted changes in traffic noise levels due to the Slower, Longer Project Alternative would be less than significant. The predicted Project-related mining and processing noise level in the vicinity of the Project access road and SR 278 is approximately 39 dB L_{dn}. This level of noise would not cause a significant change in ambient noise levels at that location in terms of L_{dn}, since the existing traffic noise would be nearly 20 dB higher than the mining and processing noise level.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.7-4:** The Slower, Longer Project Alternative would cause increases in noise levels that could impact local residences through construction activities or poorly maintained construction equipment. The maximum noise levels received at the nearest ranch house, which is approximately two miles away from the nearest areas where grading would occur, would be reduced by approximately 23 dB as compared to the values shown on Table 3.16-6, ignoring sound absorption or any shielding provided by topography; therefore, maximum construction noise levels at the nearest ranch house would be in the range of approximately 47 to 67 dB. In practice, considering the topography of the Project Area, much of the construction equipment would be shielded from view of the nearest ranch house by topography. In those cases, the construction noise levels would be further reduced by 5 to 10 dB or greater.

Significance of the Impact: Noise levels produced by construction activities or poorly maintained construction equipment in the vicinity of the Roberts Creek Ranch house could be significant if such activities occurred at nighttime or if the noise level exceeds 55 dB.

- **Mitigation Measure 3.16.3.7-4:** Construction in the vicinity of the Roberts Creek Ranch house or greater sage-grouse leks would be limited to daylight hours **and would be limited during lekking periods (see Appendix D, Attachment 3)**. Construction equipment used in the vicinity of residences would be fitted with the best available technology manufacturers' noise control equipment, including engine exhaust silencers and acoustical enclosures. Noise control equipment would be maintained in good working order. Implementation of this mitigation measure would result in a less than significant impact.

- **Effectiveness of Mitigation and Residual Effects:** The implementation of this mitigation measure would be effective at reducing the potential impact to less than significant by controlling the generation of the noise.

- **Impact 3.16.3.7-5:** Noise caused by blasting during construction and mining could cause annoyance if residents were startled by unexpected blasts, or if blasting overpressures caused rattling of residence windows. The Slower, Longer Project Alternative would not otherwise impact auditory resources associated with blasting.

  Significance of the Impact: This impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.16.3.7-6: The Proposed Action could generate flyrock. However, Project design would limit the potential for flyrock to travel beyond the Project fence.**

  Significance of the Impact: This impact would not be considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.16.3.7.2 Residual Adverse Impacts

There are no residual adverse impacts associated with the Slower, Longer Project Alternative.

3.17 Socioeconomic Values

3.17.1 Regulatory Framework

The NEPA requires consideration of local plans and policies in the assessment of the social and economic effects of proposed activities involving federal lands (43 CFR 1506.2). Federal, state, and local plans and guidelines that apply to social and economic values within the Socioeconomic Values and Environmental Justice Study Area (Study Area), include the following: Eureka County 2010 Master Plan, including the updated Natural Resources, Federal

or State Land Use, and Economic Development Elements; the Shoshone-Eureka RMP; and the Land and Resource Management Plan for the Toiyabe National Forest.

The updated Growth Management, Public Facilities and Services, Economic Development, Land Use (Eureka County 2010), and Housing Elements of the Eureka County Master Plan outline specific goals that pertain to the Proposed Action and alternatives. Guidance and input for this assessment have also been provided by Eureka County staff, the Board of Eureka County Commissioners, and the Eureka County NEPA Committee.

3.17.2 Affected Environment

3.17.2.1 Study Methods

The baseline descriptions and data presented below are based primarily on the Mount Hope Project Socioeconomic Assessment (2008 Socioeconomic Assessment) prepared by Blankenship Consulting LLC and Sammons/Dutton LLC for EML in 2008 (BCLLC/SDLLC 2008). That document is incorporated by reference and copies are on file at the BLM MLFO. The baseline also reflects supplemental information developed in consultation with Eureka County and submitted to the BLM (BCLLC/SDLLC 2009; Appendix **E**). In part, the supplemental information provided a series of three analyses to examine the implications of alternative demographic and residency assumptions on the population and demographic effects presented in the Socioeconomic Assessment, which is considered the Base Case. Results of this sensitivity analysis **(SA)** are summarized in Section 3.17.3.3.2 of this EIS. A copy of the memorandum describing the **SA** can be found in Appendix **E** of this EIS.

The EIS also considers material changes in economic, demographic, public infrastructure, service and fiscal conditions and EML plans that have occurred since the 2008 Socioeconomic Assessment was prepared. Information for the update was drawn from published sources as cited and from information provided by Eureka County and EML.

3.17.2.1.1 Study Area

The primary social and economic study area for the proposed project is Eureka County (Figure 3.17.1), focusing on southern Eureka County, particularly the community of Eureka and the nearby 3rd Street/Devil's Gate, Diamond Valley**, and Kobeh Valley** rural areas. Other, more distant communities, including Carlin, Elko, Ely**, Crescent Valley,** and Austin, are considered in terms of their potential to be a source of workers for the Project and for meeting housing needs of non-local workers of the Project during both the construction and operations phases of the Project.

There are no incorporated towns in Eureka County. Eureka County provides public services throughout the county. Eureka, the county seat, and Crescent Valley, which is located in the northern part of the county on the Lander County border, are unincorporated towns as defined by NRS:[2] The community of Beowawe is also located in the northern part of Eureka County, approximately six miles south of Interstate 80 (I-80). Beowawe does not have unincorporated

[2] NRS 269.520. "Unincorporated town" or "town" means a specific unincorporated area within a county in which one or more governmental services are provided by the county in addition to those services provided in the general unincorporated area of the county, for which the residents of such area pay through ad valorem taxes or for which other revenue is secured from within the area.

Elko
HUMBOLDT COUNTY
Carlin
227
Battle Mountain
80
ELKO COUNTY
305
306
228
278
LANDER COUNTY
EUREKA COUNTY
Bald Mtn.
Austin
50
Ruby Hill
Eureka
WHITE PINE COUNTY
25 Miles to Ely
Pan
379
NYE COUNTY
6

BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

EXPLANATION

N

- Project Boundary
- Social and Economic Values and Environmental Justice Study Area

Land Status

- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Forest Service
- Fish and Wildlife Service
- Nevada State
- Private
- Water

0 5 10 15 20 Miles

DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD	
CHECKED: -	APPROVED: RFD	DATE: 08/23/2012	
FILE NAME: p1635_Fig3-17-1_SocioStudyArea.mxd			

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Social and Economic Values and Environmental Justice Study Area

Figure 3.17.1

town status. The Town of Eureka is substantially closer to the proposed Project than other northeastern Nevada communities (Table 3.17-1).

Table 3.17-1: Cities and Towns within 100 Miles of the Project Area

City or Town	County	Approximate One-Way Travel Distance (miles)	2010 Population
Eureka	Eureka	23	610
Crescent Valley	Eureka	60 (gravel surface)* or 108 (highway)	392
Carlin	Elko	70	2,368
Elko	Elko	90	18,297**
Ely	White Pine	100	4,255
Austin	Lander	73	192

*Although Crescent Valley is approximately 60 miles from the Project Area, travel between the two locates requires approximately 1.5 hours.
** This value does not include Spring Creek or areas surrounding Elko.
Source: U.S. Census Bureau 2010; BCLLC/SDLLC 2008.

3.17.2.2 Existing Conditions

3.17.2.2.1 Population and Demography

Table 3.17-2 displays U.S. Census Bureau decennial population counts from 1880, the first census taken following the creation of Eureka County, through 2010, the most recent census. The County's population trended downward from a high of over 7,000 in 1880 to the low of 767 residents in 1960. The population has increased to 1,987 in 2010.

Table 3.17-2: U.S. Census Bureau Eureka County Population Between 1880 and 2000

Census Year	Eureka County Population
1880	7,086
1890	3,275
1900	1,954
1910	1,830
1920	1,350
1930	1,333
1940	1,361
1950	896
1960	767
1970	948
1980	1,198
1990	1,547
2000	1,651
2010	1,987

Source: U.S. Census Bureau 2006 for 1880 – 1910; Eureka County Economic Development Council 2006 for 1920 – 2000; U.S. Census Bureau 2010 for 2010

During the past decade, the Eureka County population declined from 1,651 in 2000 to 1,384 in 2002, and subsequently climbed to 1,987 in 2010 (Table 3.17-3). Population trends in Eureka County's unincorporated towns mirror those of the entire County and employment in the mining industry between 2000 and 2010. As shown, the population of the towns of Eureka and Crescent Valley generally followed that of the County, initially declining and then growing modestly, followed by another cycle of contraction and expansion. The low point in terms of County population coincided with suspension of operations at the Ruby Hill Mine. Such patterns are not uncommon in small, rural western communities, where many types of natural resource and infrastructure development activities can trigger short-term population influxes, followed by a comparable decline in population when the activity is completed.

Table 3.17-3: Eureka County Population 2000 to 2010

Area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Eureka County	1,651	1,506	1,384	1,420	1,484	1,485	1,460	1,458	1,553	1,562	1,987
Eureka Town	499	470	434	446	454	440	433	431	473	483	610
Crescent Valley	330	298	279	300	304	311	292	289	283	283	392

Source: Nevada State Demographer 2010.

The Nevada State Demographer's office is funded by the Nevada Department of Taxation and is responsible for preparing annual population estimates and periodic population projections for Nevada's counties, cities, and unincorporated towns. Population projections are prepared using the REMI[3] model, with the model's default assumptions modified to reflect local knowledge about key economic activities across the state. The Demographer also consults Moody's (www.moodys.com) for economic data. The current forecasts for Eureka County, prepared in advance of the 2010 census and predicated on a 10 percent increase in countywide employment by 2017, followed by nearly a decade of stable employment, anticipated modest population growth through 2016/2017, followed by a decline of approximately 200 residents over the subsequent 15 years. The declines reflect a combination of assumed employment losses and demographic trends associated with the aging baby-boom population. The forecasts do not include the proposed Project, nor do they include allowances for any future but currently undefined activities, e.g., new mines, or other factors, such as retirement migration to the Town of Eureka, which might drive local growth development (Nevada State Demographer 2010).

At the time of the 2010 Census, just over two-thirds of the County's residents (1,351) lived in the Town of Eureka and nearby rural areas in the southern portion of the County, with 636 residents in Crescent Valley, Beowawe and elsewhere in the northern portion of the County. Approximately 53 percent of the residents were male and the median age of area residents was 42.4 years compared to 36.3 years in the State of Nevada as a whole. Residents 18 to 65 years of age comprised 62 percent of the County's population. The average household size in southern Eureka County was 2.38 persons, noticeably smaller than the statewide average of 2.65 individuals (U.S. Census Bureau 2010).

The racial composition of the local population in southern Eureka County is more predominately white than that of the state as a whole. In 2010, 89.6 percent of area residents identified

[3] The REMI model is a proprietary economic-demographic model developed and marketed by Regional Economic Models, Inc. The model has broad acceptance within the professional community. The version used by the Nevada State Demographer has both a statewide component and separate modules for each of the state's 16 counties and for Carson City.

themselves as white, alone or in combination with one or more other races. That compares to 66.2 percent at the statewide level (U.S. Census Bureau 2010).

3.17.2.2.2 Housing

Eureka County had a total of 1,076 housing units in 2010 (see Table 3.17-4), a net increase of 51 units, or five percent, compared to the 2000 Census (U.S. Census Bureau 2002; 2010). The net change is consistent with that reported by the Eureka County Assessor based on local property tax records (Personal Communication, Michael Mears, Eureka County Assessor 2010). Most of the additions were multi-family units including some built in the Town of Eureka by Barrick to house workers at the Ruby Hill Mine (the Ruby Hill Mine is described in Section 3.17.2.2.3).

Table 3.17-4: Eureka County Housing Units 1990, 2000, and 2010 Estimate

Units	1990 Census	2000 Census	2010 Census	2000-2010 Change
Total Units	817	1,025	1,076	51
Single Family Units[1]	265	354	*	
Multifamily Units	25	37	*	
Mobile Homes/Other	527	634	*	

[1] Includes both attached and detached units.
[2] Includes 12 Senior housing units.
* 2010 Census **did not collect data** for housing units by type.
Sources: U.S. Census Bureau 2010.

At the time of the 2010 Census, 836 units or 78 percent of all units were occupied, with 240 vacant, the latter including homes held for recreational and seasonal use. Owner-occupied housing numbered 556 units and renter-occupied homes totaled 280. Two-thirds of the 2010 housing stock was located in the southern portion of the county, including in the Town of Eureka.

As in many rural western communities, mobile homes are the predominant housing type in Eureka County. Detailed housing information from the 2010 Census is not yet available at the time of this update, but according to the Eureka County Assessor, 71 percent of total Eureka County housing units were mobile homes in 2011 and of the total mobile homes 52 percent were on lots and 48 percent were in mobile home parks. A total of 27 percent of all housing units were single-family (attached and detached) and only two percent were apartments (Mears 2011).

Despite a large number of unoccupied units reported in the 2010 Census, there are few housing units available for purchase or rent in southern Eureka County. The County Assessor was aware of three homes for sale in the southern part of the county in January 2011 (Personal Communication, Michael Mears, Eureka County Assessor 2011). Generally very few rental properties are available, and those that become available are filled immediately through word-of-mouth rather than advertising. The apparent anomaly between the many unoccupied units and limited availability reflects vacant properties in town that are not listed for rent or for sale, many showing signs of disrepair. The owners have chosen for unknown, personal reasons not to rent or sell these properties (Personal Communication, Ron Damele, Eureka County Public Works 2006; Personal Communication, Michael Mears, Eureka County Assessor 2007; and 2011).

The 3rd Street/Devil's Gate area in Diamond Valley has been subdivided and has the potential to develop 112 lots (Lumos & Associates 2007). These lots are served by County-maintained General Improvement District (GID) water systems but do not have wastewater collection and treatment services so homeowners rely on septic systems. An additional 122 lots in the adjacent Ruby Hill Subdivisions - North and South are anticipated to be absorbed into the Devils Gate #2 GID (Damele 2010).

In 1997 Eureka County annexed 164 acres of land near the Eureka County fairgrounds, formerly administered by the BLM, into the Town of Eureka. The County and EML entered into a lease agreement for the site, now known as the Eureka Canyon Subdivision, allowing for the placement of temporary housing on the site. Subsequent to that lease, EML performed $5.1 million on earthwork, tree removal and site preparation. Eureka County and EML mutually agreed to terminate the lease in 2010, but agreed that a portion of the site could be used to accommodate housing to meet needs of the community, including those needs of EML's Project (Fiorenzi and Hansen 2010). The Eureka County Commission subsequently entered into a contract with Nevada Rural Housing Authority to develop housing in the Eureka Canyon Subdivision. The subdivision could accommodate up to 110 multi-family units, 122 single-family residential units and some commercial development under a preliminary subdivision plan (Johnson 2010). There are also 47 residential lots in the Prospect Subdivision and 85 potential infill lots within the town (Damele 2010), although some of the latter are not readily developable or on the market (Housing in Southern Eureka County 2011).

The southern Eureka County housing inventory has grown slightly in recent years. During 2009 and 2010 only two conventional single-family homes were built in the Town of Eureka and five were built in Diamond Valley. Barrick constructed four of these units to house Ruby Canyon Mine employees. Barrick also developed several new rental apartment units in 2009, which were immediately occupied upon completion. Approximately ten new manufactured homes have been placed on lots during the last two years, primarily in Diamond Valley (Mears 2011).

Temporary housing resources are limited in southern Eureka County. All temporary accommodations for tourists and visitors, including four motels offering a total of 88 rooms, are located in the Town of Eureka (Eureka County 2010). Four mobile home and recreational vehicle (RV) parks provide nearly 100 spaces for short- and long-term rental. During the peak summer travel and hunting seasons, the short-term accommodations are frequently at or near full occupancy (BLM 2005). A 36-space mobile home park located within the Town of Eureka was purchased and refurbished by EML. One previously closed RV park is undergoing refurbishment and a new park with approximately 30 RV spaces is under construction (Personal Communication, Michael Mears, Eureka County Assessor 2011).

Housing in Other Area Communities

Table 3.17-5 displays housing information from the 2010 Census for communities within 100 miles of the Project.

Table 3.17-5: Housing in Communities within 100 Miles of the Project Area

	Crescent Valley	Carlin	Elko	Ely	Austin
Total Housing Units	237	1,043	7,221	2,185	162
For Rent	17	82	203	67	8
For Sale	5	2	36	40	1

Source: U.S. Census Bureau 2010 (Webcensus Factfinder 2)

Table 3.17-6 displays temporary housing resources (hotels, motels and RV parks) in communities within 100 miles of the Project.

Table 3.17-6: Temporary Housing Resources in Communities within 100 miles of Eureka County

	Crescent Valley	Carlin	Elko	Ely	Austin
Motels/Rooms	0/0	3/101	31/1,890	18/663	3/39
RV Parks/Spaces	1/30	1/47	7/518	9/244	2/32

Sources: Nevada Commission on Tourism 2011

3.17.2.2.3 Economy and Employment

Employment

Mining dominates the Eureka County economy in terms of employment and earnings. This dominance is reflected in the statistics on Eureka County employment by place of work, but not by statistics on employment by place of residence, which are more reflective of the much smaller and more recent mining presence in southern Eureka County. Total employment increased by more than 460 percent between 1984 and 1997, topping 5,300 jobs in 1997, led by increases in mining employment from 485 to 4,347 in those years. This dramatic increase was the result of the startup and expansion of several gold mines along the Carlin Trend[4] in the northern part of the County whose employees reside for the most part outside of the County. During the peak employment year of 1997, total employment reached 5,321, driven by record high mining employment of 4,374. The latter included the startup operations for the Ruby Hill Mine in southern Eureka County, although that mine accounted for less than three percent of total mining jobs in Eureka County that year. Mining was 82 percent of total employment in the County during that year. Mining employment subsequently fell to 3,180 in 2003. The drop in mining employment resulted in a corresponding drop in total County-wide employment to 3,964 in 2003. Since that time, mining and total employment have both increased (see Table 3.17-7, which summarizes employment trends for Eureka County from 2000 to 2009).

[4] The Carlin Trend, one of the world's most productive gold mining districts, is a northwest trending belt of mineral deposits over 50 miles long and five miles wide extending through northern Eureka County into Elko County on the northwest and southeast.

Table 3.17-7: Eureka County Employment, by Broad Industrial Grouping, on a Place of Work Basis, 2000-2009 (Selected Years)

Year	Farm	Mining[1]	All Other Private[2] (non-farm)	Government	Total
2000	162	3,735	370	229	4,496
2001	127	3,615	274	229	4,245
2002	110	3,405	297	209	4,021
2003	127	3,304	367	166	3,964
2004	134	3,324	356	171	3,985
2005	143	3,565	321	199	4,222
2006	155	3,795	623	209	4,782
2007	157	4,005	1,121	219	5,502
2008	161	4,045	495	229	4,930
2009 (est)	161	4,112	462	189	4,924

[1] Mining employment for 2002 through 2004 is based on the U.S. Bureau of Economic Analysis' (U.S. BEA's) reported 2001 employment and year-to-year changes in mining jobs between 2001 and 2004 reported by the Nevada Department of Employment, Training, and Rehabilitation (NDETR). The vast majority of these mining jobs have been located at mines in northern Eureka County.

[2] All Other Private includes agricultural services and forestry, construction, manufacturing, wholesale and retail trade, transportation and utilities, and services.

Source: BCLLC/SDLLC 2008; U.S. Bureau of Economic Analysis, 2006 and 2010a; Nevada Division of Employment, Training and Rehabilitation, 2006.

Most Eureka County mining employment is associated with gold mines in the northern part of the County. In 2009, Newmont Mining Corporation's Eastern Nevada Operations employed 2,175 workers and Barrick's Goldstrike Betze-Post operations employed 1,008 workers. Barrick's Ruby Hill Mine, adjacent to the Town of Eureka, employed 127 workers (Nevada Bureau of Mines and Geology 2010). The Ruby Hill Mine, an open pit, cyanide heap leach gold mine, was opened in the mid-1990s by Homestake and acquired by Barrick in 2001. Mining ceased from 2002 until 2006, when Barrick began mining the East Archimedes extension at the mine. A few Eureka County residents also worked at the Cortez Gold Mine in Lander County and Barrick's Bald Mountain Mine in White Pine County.

Aggregate commuting/journey to work data are available from the 2000 Census. That data shows that 66 percent of workers employed in Eureka County lived in Elko County, 28 percent in Eureka County, and five percent in Lander, White Pine County and Washoe counties. The majority of the commuters are employed at gold mines located in northern Eureka County. These mines are relatively close to Elko and Carlin and at least a portion of the commute from Elko is over interstate highway.

Although the mining industry is the dominant employer in the County, other sectors play roles in supporting the County's economy, particularly that segment located in the southern portion of the County. Other sectors include agriculture, government and public education, retail trade and services, and construction. The levels of economic activity and employment in sectors other than agriculture, particularly construction, have historically reflected changes in mining activity, but they also reflect non-mining related demand, including that from tourism and outdoor recreation.

Farm employment has experienced some volatility in recent times, declining for several years at the beginning of the decade, but increasing thereafter. As a consequence, farm employment in 2009 was reported at 159, a net loss of three farm jobs as compared to 2000. The National Agricultural Statistics Service (NASS) reported 86 farms in Eureka County in 2007, up from 73 in 2002 and 84 in 1997 (NASS 2009). Eureka County farmers and ranchers reported just over $25 million in agricultural product sales in 2007 and out of 17 counties in Nevada, Eureka County was ranked fourth in the state in terms of crop **sales and eighth in terms of sales of livestock, poultry, and their products**. **Total** sales rose to $32.5 million in 2008, declining to $26.5 million in 2009 (U.S. BEA 2010a; 2010b). Revenue derived from livestock sales generally account for 60 percent to 70 percent of the **total** sales by local farms and ranches. Cattle account for most of the livestock raised in Eureka County with sheep and horses accounting for most of the remainder. **In 2007, 48 out of the 86 Eureka County farms had cattle; 43 with beef cattle (NASS 2009). The seven BLM grazing allotments identified in Section 3.12.2.2 consist of approximately 545,000 acres of public land. In Eureka County as a whole, the BLM manages 1,880,486 public acres in allotments under term grazing permits. Approximately 40 ranching operators are permitted to use these public acres for livestock grazing (Rangeland Administration System [RAS]) (BLM 2012b). The 2007 Census of Agriculture indicates that the 86 Eureka County farms cover 783,440 acres (of which approximately 727,000 acres are pastureland dedicated solely to grazing) up from 266,427 acres in 2002 and 201,077 acres in 1997. These land areas should not include public lands used by farms for grazing. Given that total non-Federally owned land in Eureka County is 564,557 acres, it appears that 2007 Census of Agriculture data on private farm acreage were inaccurate. The 1997 and 2002 figures (approximately 200,000 to 250,000 acres) may better reflect private farmland in the county.**

Two areas potentially affected by the Project are the Diamond and Kobeh Valleys. Diamond Valley, located east of the Project Area, is an agricultural area irrigated by groundwater and center-pivot irrigation systems. Diamond Valley is known for its high quality native hay and alfalfa that is in some cases sold to specialty markets including dairies and racehorse breeders and trainers. Most Diamond Valley production is exported to other states and abroad. Approximately 22,000 acres are irrigated in Diamond Valley (see Section 4.3.1 Grazing and Agriculture). Agricultural use of the Kobeh Valley, located south and west of the Project Area, is used primarily for grazing. Only 1,200 acres were under cultivation in Kobeh Valley in 2007 (see Section 4.3.1).

Government employment, which includes federal, state and local government and public school employment, had increases through much of the 1990s, eventually peaking at approximately 280 in 1997/98 (U.S. BEA 2006). Public sector employment subsequently declined to 166 in 2003 before climbing to 216 in 2009. Available data from the NDETR for 2009 suggest a year-to-year loss in state government employment based in Eureka, most likely reflecting changes associated with the state's severe fiscal crisis brought on by the national economic recession.

Other private sector employment in Eureka County, which includes construction, retail trade and services, increased during the period when mining activities increased in the mid-1990s and then followed the decline in employment during the 2000 through 2002 period; however, other private employment increased during 2003 and 2004, which could have been a result of the induced effects of the Falcon-Gondor transmission line construction project.

The local business sector in the Town of Eureka is limited in diversity and scale, focused primarily on essential consumer, building, and automotive goods and services. Retail shopping opportunities include groceries, hardware and lumber, auto parts/fuel/supplies, and novelties and gifts targeted at tourists. There are also several restaurants and other food service establishments, two bars and a casino in the Town of Eureka. Consumer and business services include a bank, motels, RV/mobile home parks, equipment rental, trucking and motor vehicle repair services. Consumers use the internet or travel to Elko, Reno, or elsewhere to access a wider selection of goods, financial services, and a broader range of medical and dental care (BCLLC/SDLLC 2008).

As of the second quarter of 2010, Eureka County hosted 62 private and public employers, including a total of 8 federal, state and local governmental entities, 14 in consumer oriented trade and services other than health care, three in health care, and 16 in construction and mining (NDETR 2010).

Tourism and recreation attractions in southern Eureka County include hunting, fishing, sightseeing, OHV use, visits to the Eureka Opera House and Sentinel Museum, general interest in the historic mining character of the community, and events such as the County fair, County youth fair, high school rodeo, and a series of horse shows, softball tournaments, bicycle races, and shooting and archery tournaments (BCLLC/SDLLC 2008). Travelers along U.S. Highway 50, including bicyclists and motorcyclists, contribute to the southern Eureka County economy. The scale of the retail and services sectors in Eureka County result in numerous limitations on the reporting of employment, number of establishments, sales and sales tax receipts, and other economic data. In addition, recreation and tourism cut across multiple retail and service sectors and are not distinct; as a result, such data are not readily available.

Labor Force and Unemployment

Eureka County's labor market conditions generally parallel trends in the mining industry, although they are more closely tied to activities in the southern part of the County because most employees of the mines in northern Eureka County live in other counties. The local labor force grew from 785 in 1994 to 1,019 in 1998 when mining employment in the region was at its peak and the Ruby Hill Mine near the Town of Eureka was initiating operations. The resident labor force declined after the peak, partially in response to the suspension of operations at the Ruby Hill Mine. In 2005, when construction of the East Archimedes expansion of the Ruby Hill Mine was underway, the labor force stood at 674 and unemployment at 3.6 percent. In the fall of 2006, Eureka County and northeastern Nevada in general were experiencing a labor shortage. In September 2006, there were 243 employers who listed job openings with the Elko office of Nevada Job Connect, and many of those listings were for multiple positions. Employers in Eureka County reported difficulties filling vacant positions (BCLLC/SDLLC 2008). As shown in Table 3.17-8, the labor force subsequently grew to 911 in 2010, more than 29 percent over the 2006 level, even as effects of the recession resulted in increased unemployment.

Table 3.17-8: Eureka County Labor Force, Unemployed and Unemployment Rate Selected Years

	2005	2006	2007	2008	2009	2010	2011 (Apr)
Labor Force	674	705	797	843	893	911	879
Unemployed	24	28	35	43	66	83	54
Unemployment Rate (%)	3.6	4.0	4.4	5.1	7.4	9.1	6.1

Source: U.S. Bureau of Labor Statistics (BLS) 2011.

Table 3.17-9 shows the annual unemployment rates for Eureka County, Nevada, and the U.S. from 2005 to 2010. Prior to the expansion of mining in the region, which began in the early 1980s when intensive exploration of the Carlin Trend coincided with higher gold prices; Eureka County's unemployment rate was higher than that for Nevada and the U.S. The unemployment rate declined below the statewide and national averages from 1999 through 2002, the years when the Ruby Hill Mine was operating, rising slightly after the mine suspended operations. Bolstered by the mining industry, local unemployment rates have been below the state and national rate since 2005, and particularly in recent years when the global recession resulted in substantially higher unemployment. Nevada's unemployment rate, dominated by drastic decline in construction and gaming and tourism in Clark County/Las Vegas averaged 14.9 percent in 2010.

Table 3.17-9: Average Annual Unemployment Rates, United States, Nevada, and Eureka County

Location	Percentages					
	2005	2006	2007	2008	2009	2010
U.S.	5.1	4.6	4.6	5.8	9.3	9.6
Nevada	4.5	4.2	4.6	6.7	12.5	14.9
Eureka County	3.6	4.0	4.4	5.1	7.4	9.1

Source: U.S. BLS 2011.

Personal Income

Eureka County personal income data by place of work statistics reflect the effect of the Barrick and Newmont mines in the northern part of the County. Following the opening of these mines, total earnings increased more than five-fold to $182 million between 1985 and 1990 (U.S. BEA 1984). Further increases marked the expansion of those mines, with total annual earnings reaching $274.8 million in 1995. Since that time, total earnings on a place of work basis have climbed, but at a slower rate.

The non-local status of the northern mines' employees is reflected in the labor earnings data. As shown in Table 3.17-10, most of the labor earnings paid by Eureka County employers flow out of the local economy. During 2004 a net outflow of $247.9 million occurred, equivalent to 81 percent of the total $307.9 million in wages and salaries paid to jobs located in Eureka County. In 2004 the personal income of residents, including adjustments for social security deductions and other income such as interest and dividends, was $40.9 million. Five years later in 2008, total earnings paid by Eureka County employers had climbed nearly 40 percent to $429.3 million

and the net outflow increasing to $335.6 million. The aggregate personal income of residents was $65.0 million.

Table 3.17-10: Eureka County Personal Income by Place of Residence: Selected Years

	2004	2005	2006	2007	2008
Earnings by Place of Work ($ M)	307.9	311.7	387.6	457.6	429.3
Residency Adjustment ($ M)	-247.9	-247.3	-310.1	-367.1	-335.6
Social Security Deductions ($ M)	-$32.7	-32.5	-41.2	-49.7	-43.7
Other Income to Residents ($ M)	13.6	13.7	13.3	14.2	15.1
Total Personal Income - Residents ($ M)	40.9	45.6	49.6	55.0	65.0
Per Capita Income	$28,827	$33,238	$33,944	$35,826	$40,674

1) ($M) = millions of current dollars. 2) A negative residency adjustment reflects the net earnings of workers employed in Eureka County, but who reside elsewhere, primarily in Elko County, that are in excess of the earnings of Eureka County residents employed outside the County.
Source: U.S. BEA 2010c.

Although higher than Nevada and the U.S. before the late 1990s, Eureka County residents fell below the state and nation in terms of per capita income during the 2000 to 2007 period. In 2004 the per capita income of Eureka County residents ($28,827) was 15 percent below the statewide average of $33,787 and 13 percent below the nationwide average of $33,050 for that year. Personal income growth in Eureka County in recent years has outpaced that across the state and nation, such that local per capita in 2008 ($40,674) was again comparable to the statewide and national averages (see Table 3.17-11). Median income in Eureka County during 2009 was $56,815, approximately seven percent higher than the Nevada statewide median income of $53,310, and 13 percent above the national average ($50,221) (U.S. Census Bureau 2010).

Table 3.17-11: Per Capita Personal Income, Eureka County, Nevada, and United States Selected Years

	1990	1995	2000	2005	2006	2007	2008
Eureka	$23,052	$25,708	$23,299	$33,238	$33,944	$35,826	$40,674
Nevada	$20,346	$24,817	$30,437	$38,117	$39,231	$40,930	$40,936
United States	$19,447	$23,076	$29,845	$35,424	$37,698	$39,392	$40,166

Source: U.S. BEA 2010d.

3.17.2.2.4 Fiscal Conditions

Local government finances in Nevada are complex, involving locally derived and state-shared revenues. The former consist primarily of ad valorem/property taxes on real and personal property and the net proceeds of mines operating in the County. The latter include sales, motor vehicle, fuel and gaming tax revenues. Intergovernmental revenues from the state are also very important for rural Nevada counties, having evolved in response to the state's unique tax, economic and geopolitical structures, including the differences in economic conditions affecting the Las Vegas and Reno metropolitan areas, as compared to those affecting rural agricultural and mining communities.

Eureka County's current fiscal structure reflects a heavy reliance on ad valorem taxes and intergovernmental transfers, combined with the influences of a small population base, large

service territory, and year-to-year variances in the mining related tax base and revenues. For example, Eureka County's assessed valuation, which also supports local property taxes for the school district, declined by more than $154 million (31 percent) between fiscal years 2001/2002 and 2002/2003, following a reappraisal of the mines, but increased by nearly $200 million the following year (Table 3.17-12). Since then, Eureka County's total assessed valuation has grown dramatically as a result of capital investment in mining, combined with the effects of higher production output and gold prices. In 2008/2009, the County's total assessed value reached an all-time historical high of $1.48 billion. The total valuation declined to $1.36 billion the following year (2009/2010) as gains of $100 million in real property assessments were offset by a drop of more than $210 million in net proceeds of mining and other assessments. Total assessed valuation climbed by $54 million for the current 2010/2011 tax year.

Table 3.17-12: Eureka County Assessed Value, Fiscal Years 2000/2001 through 2010/2011 (in Millions of Dollars)

Fiscal Year	Secured[1]	Unsecured, Including Net Proceeds of Mines[1]	Total
2000/2001	356.6	261.2	617.8
2001/2002	400.3	91.4	491.7
2002/2003	235.4	102.1	337.5
2003/2004	308.2	227.9	536.1
2004/2005	340.2	260.5	600.7
2005/2006	273.4	298.5	571.9
2006/2007	333.8	473.4	807.2
2007/2008	381.9	628.1	1,010.0
2008/2009	473.1	1002.2	1,475.3
2009/2010	573.4	789.5	1,362.9
2010/2011	648.6	767.7	1,416.3

[1] Secured property generally refers to real property, mobile homes placed on foundations, and some improvements held by a title, whereby the taxes assessed create a lien on the property. Unsecured property generally refers to personal property, mobile homes not place on foundation, and other property interest subject to property tax.
Source: Nevada Department of Taxation 2010.

The volatility in taxable value carries over to ad valorem tax revenues, influencing local government and school district fiscal budgeting and policies. Within the past five years, ad valorem taxes levied by Eureka County increased from $5.2 million in fiscal year 2005/2006 to $17.2 million in 2008/2009 (Table 3.17-13). The latter was a record high, occurring in part due to legislatively approved changes in the collection of net proceeds of mining taxes. These changes resulted in a one-time advancement of receipts that the County would have previously received in 2009/2010. Although the one-time acceleration in receipts contributed to a decline in tax revenues the following year as the new schedule was established, the total revenues were still nearly 50 percent higher than in 2007/2008 due to the intervening increases in production levels and higher market value.

Combining the real and personal property valuations associated with the mining industry and net proceeds reveals that the mining industry accounts for approximately 90 percent of the total ad valorem tax base of the County and ECSD. Intergovernmental revenues can also vary dramatically from year to year, which when combined with fluctuations in taxes on net proceeds

results in substantial variances in total revenues. Over the past five years the County's total revenues increased from $17.7 million in 2005/2006 to $32.1 million in 2008/2009, the latter reflecting a one-time shift in the assessment and receipt mining tax revenues in response to statutory changes. Total revenues declined by $2.9 million the following year (approximately nine percent) with declines from most sources other than intergovernmental transfers, the latter increasing by $2.2 million.

Table 3.17-13: Eureka County Revenues (In Dollars): Fiscal Years 2006 to 2010

	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
Taxes	$ 5,155,474	$ 7,106,760	$ 8,845,802	$ 17,219,653	$ 12,892,856
Licenses and Permits	$ 16,747	$ 14,960	$ 12,932	$ 12,633	$ 16,376
Intergovernmental	$ 8,809,292	$ 11,578,968	$ 11,261,021	$ 11,081,640	$ 13,318,785
Charges for Services	$ 1,209,527	$ 1,319,790	$ 1,571,648	$ 2,348,076	$ 1,935,850
Fines and Forfeits	$ 153,570	$ 178,792	$ 102,324	$ 123,652	$ 93,025
Miscellaneous	$ 2,372,550	$ 2,367,536	$ 2,701,718	$ 1,302,759	$ 985,147
Total Revenue	**$ 17,717,160**	**$ 22,566,806**	**$ 24,495,445**	**$ 32,088,413**	**$ 29,242,039**

Source: Eureka County 2010.

Intergovernmental revenues account for the vast majority of the County's non-ad valorem tax revenues. A total of $13.3 million in such revenues were received in 2009/2010, up from $8.8 million in 2005/2006. Intergovernmental revenues from the state include the Basic County-City Relief Tax, Supplemental County-City Relief Tax, motor vehicle property taxes, and fuel taxes. Basic County-City Relief Tax and Supplemental County-City Relief Tax are statewide sales and use taxes enacted to provide property tax relief. Basic County-City Relief Tax is a state-mandated county-imposed sales and use tax returned to the county of origin, while revenues derived from the Supplemental County-City Relief Tax sales and use tax are pooled and distributed according to a specific formula. Intergovernmental revenues also include various federal payments and grants, including receipts of federal Payments in Lieu of Taxes (PILT). In 2010, federal PILT payments totaled $275,208, based on 2,156,915 acres of qualifying federal lands (BLM 2010).

Recognizing the volatility in revenues and timing lags associated with mining activity, assessment of taxes and receipt of revenues, the Board of Eureka County Commissioners has a long-standing policy to maintain relatively steady property tax rates, funding reserve accounts during periods of prosperity and drawing down reserves to cushion the budgetary impacts of mine closures or declining net proceeds or assessments (BCLLC/SDLLC 2008; BLM 2005).

The overlapping ad valorem tax rates of all entities imposed on property in the Town of Eureka is $1.9896 per $100 of assessed valuation for 2010/2011. That rate is consistently the lowest or among the lowest rates in the state and is more than 45 percent below the state-mandated maximum of $3.64. Table 3.17-14 shows the ad valorem tax rates in the Town of Eureka during fiscal year 2010. Eureka County's levy is $0.8458, 43 percent of the total. ECSD's levy is $0.750, the mandated statewide levy, a drop of $0.1625 from the preceding year reflecting the retirement of the district's outstanding bonded debt and subsequent elimination of the corresponding debt service levy. Other levies include $0.2153 per $100 of assessed value dedicated to the Town of Eureka primarily to fund public works, a county-wide levy to support television service, and a state-mandated levy of $0.17.

Table 3.17-14: Ad Valorem Tax Rates in the Town of Eureka: Fiscal Year 2010/2011

Taxing Entity	Tax Rate ($)
Eureka County	0.8458
Eureka County School District	0.7500
Eureka Town	0.2153
State of Nevada	0.1700
Eureka County Television (TV) District	0.0085
Total	1.9896

Note: Rates are in dollars per $100 of assessed valuation.
Source: Nevada Department of Taxation 2010.

County-wide ad valorem taxes also apply to the net proceeds of mining. Such proceeds are taxed by the state at a rate of $5.00 per $100 of net proceeds. From the total revenues thereby generated, revenues equivalent to those that would have been derived by the local levy are returned to the county and school district of origin, the remainder being retained by the state to fund other needs. While the level of local revenues derived from net proceeds can vary considerably from year-to-year in response to market prices, production and allowable deductions by the mining companies, more than $5.1 million in net proceeds revenues accrued to the county, with another $9.1 million to the school district in 2009.

Eureka County expenditures have increased in recent years from $12.5 million in 2005/2006 to $28.2 million in 2009/2010, the rise generally tracking the growth in revenues over time (Table 3.17-15). Budgeted expenditures increased across all major functions/departments. Much of the increase is accounted for by non-recurring outlays for facility and road improvements funded from current revenues and the County's accumulated reserves for such purposes.

Table 3.17-15: Eureka County Budgeted Expenditures Fiscal Years 2006 to 2010

	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
General Government	$ 3,089,721	$ 4,563,306	$ 6,901,906	$ 9,360,002	$ 7,078,305
Public Safety	$ 1,984,091	$ 2,202,399	$ 2,620,349	$ 2,319,528	$ 3,167,273
Judicial	$ 595,857	$ 911,649	$ 1,098,340	$ 1,064,787	$ 1,126,404
Public Works	$ 2,468,542	$ 3,308,029	$ 5,158,508	$ 5,164,730	$ 7,786,714
Health and Sanitation	$ 845,291	$ 1,221,028	$ 1,062,653	$ 1,289,008	$ 1,208,777
Culture and Recreation	$ 972,314	$ 1,006,237	$ 1,086,293	$ 1,211,887	$ 1,324,386
Community Support	$ 382,374	$ 411,240	$ 384,553	$ 424,247	$ 463,467
Intergovernmental	$ 2,165,102	$ 816,100	$ 3,156,243	$ 3,816,953	$ 6,046,716
Total Expenditures	**$ 12,503,292**	**$ 14,439,988**	**$ 21,468,845**	**$ 24,651,142**	**$ 28,202,042**

Source: Eureka County 2010.

Budgeted outlays for operating purposes, including payroll and benefits associated with a staffing increase of five full time equivalents (FTEs), were more modest.

Net current revenues, defined as total revenues less total expenditures, ranged between $1.0 and $8.1 million over the past five years (Table 3.17-16). After accounting for other financing sources or outlays, net surpluses occurred in four years, the residual net revenue transferred to the County's reserve funds. As a result the County's reserve fund balances climbed by

49 percent, from $38.3 million to $57.0 million at the end of the 2008/2009 fiscal year. Capital outlays in 2009/2010 resulted in a net use of just over $710,000 in reserve balances, reducing the total reserve balance to $56.3 million.

Eureka County completed several major capital improvement projects in 2009 and 2010. These projects included a new Eureka Fire House, a water storage and distribution projects in Eureka and As treatment projects in Devil's Gate and Crescent Valley. Eureka County has a long-standing policy of refraining from the use of long-term debt for capital improvements. The policy of funding improvements using available resources reflects the substantial revenues generated by mining and the County's awareness of the uncertainties surrounding the industry and the associated potential implications for variability in tax revenues. While current plans of the existing mines indicate sufficient reserves to sustain operations for some time, variability in the price of gold can affect production levels and net proceeds, in turn affecting the County's tax base. Such uncertainties make the policy of avoiding debt when possible a prudent course of action (BCLLC/SDLLC 2008; BLM 2005).

Table 3.17-16: Eureka County Budget Summary, Fiscal Years 2006 to 2010

	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
Total Revenues	$17,717,160	$22,566,806	$24,495,445	$32,088,413	$29,242,039
Total Expenditures	$12,503,292	$14,439,988	$21,468,845	$24,651,142	$28,202,042
Net Current Revenue	$5,213,868	$8,126,818	$3,026,600	$7,437,271	$1,039,997
Other Financing Sources		$90,351	$15,000	$6,400	$(1,750,000)
Net Transfer to/Use of Reserve Fund Balance	$5,213,868	$8,217,169	$3,041,600	$7,443,671	$(710,003)
Reserve Fund Balance (Ending)	$38,330,900	$46,551,069	$49,592,669	$57,036,340	$56,326,337
Note receivable reserve	$484,328	$415,819	$343,297	$266,334	$185,656
General Fund	$10,159,434	$17,068,570	$10,450,236	$12,467,226	$10,105,839
Capital Projects	$8,541,428	$7,981,844	$9,782,820	$9,553,687	$8,741,945
Special Revenue	$19,145,710	$21,084,836	$29,016,316	$34,749,093	$37,292,897

Source: Eureka County 2010.

A very small portion of the reserve fund is held as a reserve against an outstanding note receivable; however, the vast majority of the funds are unreserved being held for potential use in meeting future general fund needs, capital projects, and other special needs as established by the County Commission.

3.17.2.2.5 Public Utilities and Eureka County Services/Facilities

Utilities

Information concerning public utilities in southern Eureka County was obtained from the Master Plan for the Town of Eureka Water and Sewer Systems and Devil's Gate GID (District 1& 2) Water Systems (Lumos & Associates 2007), from the Overview of the Summary Report of Existing Municipal Water Conditions in Southern Eureka County (Damele 2010), and from information contained in Eureka County's 2007 through 2010 Comprehensive Annual Financial Reports (Eureka County 2010).

Water Supply, Treatment, Storage and Distribution

Eureka County maintains and operates three water systems in the southern part of the county:

- Eureka Town Water System;
- Devil's Gate GID #1; and
- Devil's Gate GID District #2.

The Town of Eureka water utility is supplied by two ground water wells located approximately 3.5 miles north of town. One well produces 900 gpm and another produces 750 gpm. Water from the two wells is piped to two storage tanks that feed booster pumps, which in turn transfer the water to the town. Together the wells produced 58.4 million gallons (approximately 179 acre feet) in 2009, an increase of ten percent over the quantity produced in 1995. Water levels in both wells have been declining at annual average rates of just over two feet in recent years.

During 2009, an additional 300,000 gallon storage tank was constructed at the booster station and an additional booster pump and new generator were installed. Water storage in town now consists of a 350,000 gallon storage tank on the southeast end of town and a 750,000 gallon storage tank and newly constructed 1,250,000 gallon storage tank on the west side of town. During 2010 the water and wastewater lines on Main Street were replaced. The cost of these and other utility system improvements totaled nearly $6 million (Damele 2010).

Ten springs, which currently only provide water to a mobile home park, could serve as a supplemental water source for the town, but improvements would be required to connect the springs to the main water system. **A ROW has been issued to** Eureka County to make the necessary improvements.

The Town of Eureka water system served 276 residential and commercial customers in 2009. Average daily demand during 2009 was 160,000 gpd and maximum daily demand **(MDD)** was 480,000 gpd. Well production capacity was 1,296,000 gpd. Eureka County estimates that the potential customer base for the Town of Eureka water system could be an additional 409 customers, including 277 housing units in the Eureka Canyon Subdivision, 47 lots in the Prospect Subdivision and 85 lots in the townsite (Damele 2010).

Water supply and distribution services in the Devil's Gate area of Diamond Valley are provided by the Devil's Gate GID #1 and GID #2. GID #1 operates one well that produced 2,073,600 gallons (6.4 acre feet) in 2009. This well is capable of producing 60 gpm. GID # 1 serves 14 customers and has an average daily demand of 5,681 gallons and a **MDD** of 17,043 gallons. Given the limited land area of the district, substantial additional growth is not anticipated.

GID #2 has one 60 gpm well that serves as the primary source of water for the district. The well produced 5,733,600 gallons (17.6 acre feet) in 2009 and feeds a 250,000 gallon storage tank. A second well produces 200 gpm, but this water exceeds EPA standards for **As** and is therefore not in the municipal system, although it does provide construction water. The GID Board is in the process of making necessary improvements to bring the present system into compliance (BCLLC/SDLLC 2009; Appendix **E**). GID #2 had 41 customers in 2009 with an average daily demand of 15,708 gpd and a **MDD** of 47,125 gpd. The current storage requirement is for 225,462 gallons with fire flow of 1,000 gpm for two hours. The existing 250,000 gallon tank meets the storage requirement (Damele 2010). The County constructed an additional

400,000 gallon storage tank and installed 7,000 linear feet of water main during 2010 and early 2011 (Personal Communication, Ron Damele, Eureka County Public Works 2011).

The projected customer base for GID #2 includes an additional 234 customers including a build-out of an additional 112 lots currently within the district and the 122 lots in Ruby Hill Subdivisions – North and South – that may be absorbed into the district (Damele 2010).

As with the wells serving the Town of Eureka water system, the average decline in water levels in the Devil's Gate GID # 1 and #2 districts has been one to two feet per year.

Wastewater Collection and Treatment

Wastewater treatment services within the Town of Eureka are provided by a multiple-cell, aerated, evaporative lagoon wastewater treatment facility (WWTF) managed by the County public works department. The WWTF is currently permitted to discharge a maximum of 100,000 gpd, and currently operates at 70 percent of its permitted capacity. Eureka County has received permits to expand the facility to 200,000 gpd (Massey 2011). The estimated cost for the expansion is $1.3 million. The outfall pipe at the WWTF can accommodate approximately 100 additional connections before capacity is exceeded. Costs for expanding the outfall pipe have been estimated at $300,000 (Damele 2010).

Wastewater treatment in Diamond Valley is accomplished through the use of individual septic systems.

Solid Waste Disposal

Eureka County operates the Class II-rated Whiskey Flat Landfill just north of the Town of Eureka. The landfill serves the entire county and currently receives less than 20 tpd of solid waste including solid waste hauled from Crescent Valley. As of 2008, the landfill had an estimated 30 years of remaining life at recent disposal volumes (Research and Consulting Services, Inc. 2008). **Expansion of the current landfill site would require Eureka County to obtain the rights of mineral claims on adjacent lands.** The landfill is staffed by two County public works employees and fees are charged on a quarterly or per use basis (Personal Communication, Ron Damele, Eureka County Public Works 2006). A private vendor provides solid waste collection services in the Town of Eureka and the surrounding area.

Other Utilities

Electricity

Mt. Wheeler Power provides electric power to central and southern Eureka County including the Town of Eureka and the Project Area. Mt. Wheeler currently has capacity to serve additional customers in southern Eureka County (Personal Communication, Jesse Murdock, Mt. Wheeler Power, Inc. 2006).

Propane

Residential and commercial gas is provided by private propane vendors.

Telephone

Telephone service is provided by Nevada Bell. Cellular phone coverage is available across much of the County except in Pine Valley along SR 278.

Facilities and General Services

Eureka County is governed by a three member Board of County Commissioners elected at large to overlapping four-year terms. Each year the Board selects one of its members to serve as Chairperson. County government provides a range of services to the two unincorporated towns and to the County as a whole.

Table 3.17-17 displays Eureka County full time employment by function for the four previous fiscal years. The County added five employees during the four-year period. County employment is anticipated to increase by one staff position in the coming year.

Table 3.17-17: Eureka County Government Full Time Employees by Function, Fiscal Years 2007 to 2010

Function	Year Ending June 30, 2007	Year Ending June 30, 2008	Year Ending June 30, 2009	Year Ending June 30, 2010
General Government	17	18	18	18
Judicial	9	9	9	9
Public Safety	21	22	23	23
Public Works	24	24	25	25
Health and Sanitation	1	1	2	2
Culture and Recreation	10	10	10	10
Community Support	2	2	2	2
Total Full Time Employees	**84**	**86**	**89**	**89**

Source: Eureka County 2010.

Eureka County administrative functions include the following:

- Board of County Commissioners
- Assessor
- Clerk and Treasurer
- Recorder/Auditor
- District Attorney
- Natural Resources

Most of the Eureka County administrative offices are housed in the historic courthouse. The District Attorney, Yucca Mountain Information Office and Natural Resources Office are housed in the auxiliary administrative office building along with the Public Works Department. The courthouse was renovated in 1998.

Law Enforcement and Criminal Justice

Sheriff's Office

The Eureka County Sheriff's Office provides law enforcement for the entire County, operates the County's detention facilities and provides dispatch services for all County public safety functions including police, emergency medical and fire suppression activities. The detention facility can accommodate 20 inmates, including four female inmates. Occupancy averaged seven to eight inmates in 2006/07. Juvenile detention facilities are located in Elko, requiring the department to provide transportation services. Although an infrequent occurrence, juvenile transportation poses a burden on the department, requiring dedication of an officer and vehicle for at least a half day per trip. **Also, the Sheriff's office is responsible for the transportation of inmates for health and medical services as well as other courts of jurisdiction. Increasing that work load may require one full-time officer dedicated to transportation only** (Personal Communication, Robert Cutler, Eureka County Sheriff's Office 2006; Personal Communication, Ken Jones, Eureka County Sheriff's Office 2007).

The Criminal Justice Center is adequate for Eureka's current population in terms of overall administrative space and detention capacity. A sheriff's substation is located in Crescent Valley (Personal Communication, Ken Jones, Eureka County Sheriff's Office 2007).

In December 2010, the Sheriff's Office staff totaled 20 including the sheriff, undersheriff, patrol officers, dispatchers, administrative personnel and jailers. The department has a current staffing ratio of one patrol officer for every 100 to 200 residents. The department faces challenges recruiting qualified personnel willing to relocate to the Town of Eureka. The lack of available housing is a critical recruitment issue. Additionally, between $35,000 and $40,000 is required to provide a vehicle and equipment, and up to six months is required to fully train a new officer. Current staffing does not allow continuous seven-day per week, round-the-clock patrol in the Town of Eureka; however, officers are on call during non-patrolled hours and to back up the on-duty staff as needed. The department has a part-time animal control officer (Personal Communication, Ken Jones, Eureka County Sheriff's Office 2007; Massey 2010).

According to the Nevada Department of Public Safety (NDPS), the Eureka County Sheriff's Office made 42 criminal arrests during 2010 (NDPS 2011). Eureka County crime rates[5] are substantially lower than the State of Nevada as a whole. In 2010, Eureka County's crime rate (offenses) of 16.16 was less than half the 34.04 rate for the State of Nevada as a whole (NDPS undated).

District Attorney

The District Attorney is responsible for prosecuting all felony, gross misdemeanor, and juvenile offender cases committed within the County. The Office of the District Attorney is also the legal branch of local government representing the Eureka County Commission and other County agencies in civil, administrative, and litigation matters. The District Attorney's staff includes the District Attorney and one secretary/paralegal. The District Attorney's office has historically experienced an increase in its caseload during times of transition in communities, such as during

[5] Crime rates refer to the number of Part I offenses per 1,000 inhabitants. Part 1 offenses include: homicide, forcible rape, robbery, assault, burglary, larceny-theft, motor vehicle theft and arson.

construction projects or when a mine starts up, changes or shuts down (Personal Communication, Ted Beutel, Eureka County 2007). A majority of these cases are not Part 1 offenses.

Public Defender

Eureka County depends on the State Public Defender's office in Ely (White Pine County) to provide services for indigent defendants. Criminal representation is adequate for the current level of demand. However, civil indigent representation and legal aid service is currently inadequate (Massey 2010).

Eureka Justice Court

The Eureka Justice Court adjudicates small claims (up to $5,000), civil cases (up to $10,000), all traffic offenses, felonies up to preliminary hearing and protective orders, and also performs marriages. The justice court staff includes the Justice of the Peace, one full-time and one half-time administrative staff, and casual administrative staff, as needed (Personal Communication, J. Schweble, Eureka County Justice of the Peace 2007).

Eureka County Juvenile Probation Office

The probation office provides a variety of probation services for adjudicated youth and prevention services for adjudicated and non-adjudicated youth in Eureka County. The office has a Chief Probation Officer and a Grants Administrator. The youth probation caseload averages ten to fifteen cases per month. Probationers are also provided counseling by a licensed clinical social worker. As shown in Table 3.17-18, the probation office offers a variety of programs to its target population of Eureka County youth (Personal Communication, Karen LaBarry, Eureka County Juvenile Probation Department 2007).

Table 3.17-18: Eureka County Tutorial and Life Skills Program Participation 2010

Program	Participants
Eureka Elementary School Tutorial	43
Eureka Elementary School Life Skills	35
Crescent Valley Elementary School Tutorial	10
Crescent Valley Elementary School Life Skills	20
Eureka High School Tutorial	17
Eureka High School Life Skills	35
Girls Circle	40
Boys Council	20

Source: Massey 2010

The probation office also provides a variety of recreation and sports programs to youth throughout the County including soccer, wrestling, basketball, swimming, dance program, ski trips, graduation night, back to school pool parties, and others (Personal Communication, Karen LaBarry, Eureka County Juvenile Probation Department 2007; Massey 2010).

Emergency Response

Emergency response includes fire protection and emergency medical/ambulance services. Eureka County funds an emergency management services coordinator (Coordinator) to coordinate emergency planning, response and management among the various local service providers and to serve as a liaison with various statewide entities. The Coordinator also directs the volunteer ambulance/**EMS** in Eureka (Personal Communication, Mike Sullivan, Eureka County **EMS** 2006).

Fire Protection

Eureka County funds six local volunteer fire departments (VFDs). In addition to the Town of Eureka and Diamond Valley, VFDs are located in Beowawe, Crescent Valley, Dunphy and Pine Valley, none of which have full-time employees. These departments, along with the NDF and BLM, maintain mutual-aid agreements to augment the capacities of any given department should the need arise. Eureka County provides funds to the NDF to help fund its fire suppression activities. Two local fire departments, the Eureka Volunteer Fire Service (VFS) and the Diamond Valley VFS service southern Eureka County, the primary study area for the Mount Hope Project.

The Eureka VFS provides fire suppression service in and around the Town of Eureka. The Eureka VFS is staffed by 25 volunteers and maintains eight vehicles including the following: two Type 1 structure engines, one 3,800 gallon water tender; one Type 6 brush fire truck; two Type 4 brush fire trucks; one rescue/extraction truck equipped with jaws-of-life, spreaders, etc.; and a pumper truck, which is only used within the Town of Eureka (Personal Communication, Dan Brown, Eureka Volunteer Fire Service 2006, Massey 2010).

The rolling stock is housed in the Town of Eureka in a new two-story, seven-bay fire station commissioned in late 2009. The fire station houses the Chief's office, a training room, future living quarters and a self-contained breathing apparatus refill station. Although the Eureka VFS primary service area is southern Eureka County, the department has and would continue to be called to other parts of the County to support other VFDs and agencies for fire suppression incidents. During dry years, the department frequently responds to multiple calls per week to fight wildland fires. The VFS also accompanies the ambulance on motor vehicle accident calls. Given the large service area that the Eureka VFS must cover, response times can be as long as 30 to 45 minutes including the time required to assemble volunteers. In addition to County support, the Eureka VFS supplements its budget with social events and a raffle. Training is supplemented by the State of Nevada (Personal Communication, Dan Brown, Eureka Volunteer Fire Service 2006; Massey 2010).

Fire protection services to the area that includes the proposed Project Area are provided by the Diamond Valley VFS located on 11th Street in Diamond Valley, approximately 15 miles from Mount Hope. The Diamond Valley VFS has 13 volunteers, three of whom are certified Emergency Management Technicians (EMTs). The Diamond Valley VFS maintains the following four pieces of equipment: a structure/rescue unit; one 3,000 gallon tanker truck; an older military six-wheel drive (aka a 6x6) wildland unit; and a one-ton wildland unit (Personal Communication, Paul Strite, Diamond Valley Volunteer Fire Station 2007).

The Diamond Valley VFS maintains a three-bay fire station, to accommodate five vehicles including an ambulance. The department would like to expand the station in the future. Most

calls to the VFS are for vehicle accidents along SR 278 and for wildland fires. Response time to the Mount Hope area is likely to be over 30 minutes given the time required to assemble volunteers in this rural area (Personal Communication, Paul Strite, Diamond Valley Volunteer Fire Station 2007).

Emergency Medical/Ambulance Services

Emergency medical care and transportation are provided by the Eureka County EMS, a volunteer ambulance service serving the entire County. **The emergency medical and ambulance service also responds to calls in adjacent counties including southern Lander County, southwestern White Pine County, and northern Nye County.** The service is funded through user fees and Eureka County. In the southern part of the County, the EMS is staffed by a full-time paid EMS Coordinator, who is an EMT, and ten volunteers (Personal Communication, Mike Sullivan, Eureka County **EMS** 2006; Massey 2010). Approximately half of the volunteers are intermediate EMT certified. Two ambulances and a search and rescue vehicle are housed in the Town of Eureka. One ambulance is a larger 2009 model, with more modern treatment capabilities, capable of transporting three patients, which has improved the EMS's reliability and treatment response. An older 1997 ambulance has been stationed in Diamond Valley in anticipation of activity at the Project Area. The ambulances have radio communication with Northeast Nevada Regional Hospital in Elko, where most patients are transported. Fixed-wing and helicopter emergency medical air transportation is available to hospitals in Elko, Reno, and Salt Lake City, Utah. Overall responses and responses in southern Eureka County have been increasing in recent years. In 2005, the EMS responded to a total of 151 calls, 90 of which were in the southern part of the County. The EMS responded to 205 calls in 2009 (134 in the southern part of the county) and 211 calls through late December 2010 (125 in the southern part of the County). The EMS Coordinator anticipates hiring full-time staff if calls substantially increase (Personal Communication, Mike Sullivan, Eureka County **EMS** 2006; Massey 2010).

Health Care

Health care in southern Eureka County is provided at the Eureka Medical Clinic, located in the Town of Eureka and operated by the Nevada Health Centers, Inc. The clinic, when fully staffed, employs a physician, a physician's assistant/clinic coordinator, two medical assistants, and an administrative employee. The current physician and physician's assistant are both family care providers with experience in emergency care and pediatrics. The clinic provides a full range of basic and **EMS**. A physical therapist is available twice a week at the Eureka Clinic (Personal Communication, William Jensen, Eureka Medical Center 2006; Personal Communication, Steve Hansen, Nevada Rural Health Centers Inc. 2007; Massey 2010).

The Eureka Medical Clinic facility was constructed in 1998 with funding from Eureka County. Financial support for the clinic is provided from fees for service, county revenues, federal grants and health care funding programs. The Eureka Medical Clinic is open during normal business hours, Monday through Friday, with **24 hours per day/seven days per week** (24/7) on-call service available at other times. The clinic includes the following facilities: four examination rooms; medical supplies and records storage facilities; radiology (X-ray) facilities; emergency and basic trauma treatment facilities with advanced cardiac life support capabilities; EKG and pulmonary function diagnostic facilities; hearing and vision testing facilities; and an in-house pharmacy for prescriptions written by the clinic's physician. Eureka County recently purchased a

digital X-ray machine for the clinic (Personal Communication, William Jensen, Eureka Medical Center 2006; Massey 2010).

Most patients requiring hospitalization use the Northeastern Nevada Regional Hospital in Elko, 115 miles from the Town of Eureka. A smaller hospital is available in Ely. Patients requiring specialized care often choose to access facilities in Reno. The clinic offers immunizations and routine medical screening. Dental care is provided by a visiting dentist and a dental technician, using facilities at the clinic (Personal Communication, Steve Hansen, Nevada Rural Health Centers Inc. 2007; Massey 2010).

During 2004 the Eureka Medical Clinic had 2,287 patient visits by 904 people. Nine percent of these visits were from patients who were uninsured; three percent were covered by Medicaid; and 15 percent were covered by Medicare (NHCI 2006). The current (2010) level of patient visits is similar to 2004 levels (Massey 2010). The clinic has capacity to treat additional patients. The rural health care standard is 1,500 people for one physician (Personal Communication, Steve Hansen, Nevada Rural Health Centers Inc. 2007). There were approximately 1,350 people in southern Eureka County at the time of the 2010 Census (see Section 3.1.2.2.1).

Social and Senior Services

Eureka County provides emergency assistance (emergency food, shelter, transportation to the Nevada Department of Human Resources office in Ely) to those requesting it on an as-needed basis. The County Social Services Coordinator administers the assistance program that ranges from providing indigent health care to energy payment assistance. The income qualifications associated with most programs limit eligibility. Residents seeking social assistance available through the Nevada Department of Human Resources (cash grants, medical assistance, food stamps) must either visit the department's office in Ely, apply by mail, or over the Internet. The caseload from Eureka has traditionally been limited, with the largest demand for food stamps (BLM 2005; Personal Communication, Millie Oram, Eureka County Social and Senior Services 2007).

Eureka's Senior Citizens' Center provides lunches and a Meals-on-Wheels program to all seniors in the community. The Senior Center also organizes social and recreational events, provides transportation services, and operates a food bank for all low-income citizens. West States Apartments owns 12 housing units, which are rented to low-income seniors. These units are fully occupied and have a waiting list. Home Health coordinates a visiting helper to persons in Eureka County who need assistance in taking medicines or daily living (Eureka County Economic Development Council 2006; Personal Communication, Millie Oram, Eureka County Social and Senior Services 2007).

Library and Recreational Facilities

Eureka County provides a building, operations funding, and equipment for the library in the Town of Eureka and contracts with the Elko-Lander-Eureka Library System for personnel and administrative support. The library in the Town of Eureka is open 25 hours a week. The building housing Eureka's library was built in 1982. A wide selection of books and periodicals is available, along with Internet service and materials available through interlibrary loan accessed through a statewide computer database (Eureka County Economic Development Council 2006).

Recreational facilities and services are discussed in Section 3.15 (Recreation and Wilderness).

Public Education

Public education (kindergarten through 12th grade) in Eureka County is provided by the ECSD, which is headquartered in the Town of Eureka. In addition to administrative offices, the ECSD operates an elementary school and a junior/senior high school in Eureka, which serve students in the Town of Eureka and the southern portion of the county. ECSD operates an elementary school in Crescent Valley, which serves the Crescent Valley/Beowawe area. The ECSD sends junior and senior high school students from the Crescent Valley/Beowawe area to the Lander County School District's junior and senior high schools in Battle Mountain, and also sends some Pine Valley area students to the Elko County School District Combined School in Carlin, paying these two districts for tuition and transportation.

School Capacities

Total fall enrollment in the ECSD experienced a long-term decline from a peak of 378 students during the 1997-1998 school year to a recent low of 220 students during the 2003-2004 school year. By the fall of 2009/2010, the total had climbed to 260 students, including pre-kindergarten and kindergarten students (Table 3.17-19). The declining student enrollments had generated capacity to allow future enrollment increases within current facilities, without immediately requiring additional capital construction.

Table 3.17-19: Eureka County School District Enrollment from the 1996-1997 School Year to the 2009-2010 School Year

School Year	Enrollment		
	Kindergarten Through 6th	7th Through 12th	Total
1996-1997	189	143	332
1997-1998	220	158	378
1998-1999	204	154	358
1999-2000	187	160	347
2000-2001	152	153	305
2001-2002	149	136	285
2002-2003	139	100	239
2003-2004	129	91	220
2004-2005	127	109	236
2005-2006	117	107	224
2006-2007*	135	110	235
2007-2008 *	114	122	236
2008-2009 *	114	128	242
2009-2010 *	135	125	260

*2006-2007 and later includes pre-school and kindergarten students, at full enrollment.
Source: BCLLC/SDLLC 2008; Nevada Department of Education 2010.

The Eureka elementary school has a maximum capacity of 280 students and an optimum capacity of 240. The junior/senior high school has a maximum capacity of 232 students and an optimum capacity of 190. Maximum capacity is typically calculated by multiplying the number of classrooms by the number of students each classroom is designed to accommodate. Optimum capacity considers the appropriate amount of space that the school district determines should be dedicated to specific instructional programs or administrative functions that occur within a school building. In addition, the statutory limits on some elementary class sizes and any specific needs of incoming students (e.g., English as a Second Language classes) may limit each building's actual capacity (Personal Communication, Ben Zunino, ECSD 2007).

In operation since the 1995-1996 school year, the Eureka elementary school facility had a peak enrollment of 220 students during the 1997-1998 school year compared to the lowest fall enrollment of 94 students in 2008-2009. Class sizes and pupil to teacher ratios for elementary grades are generally under 20 students with kindergarten through third grades statutorily required to be fewer than 15 students.

The core facility at the junior/senior high school was built in 1968. Recent renovations to the junior/senior high school have replaced three older functionally and mechanically obsolete modular classrooms and relocated a bus barn and vocational shop facilities. The junior/senior high school has accommodated a peak of 160 students in the 1999-2000 school year; 2008-2009 fall enrollment was 128 students (Nevada Department of Education [NDE] 2009).

Eureka County schools are recognized among the best in Nevada. During the 2005-06 school year, both the Eureka Elementary School and the Eureka County Junior/Senior High School were designated as Nevada High Achieving Schools by the NDE. The Eureka County Senior High School was also designated a STARS Honor Grant High School. ECSD schools consistently score higher than the statewide average on the Nevada Criterion-Referenced Examinations.

School District Fiscal Conditions

Unlike many other school districts in Nevada that rely on state funding, ECSD derives virtually all of its revenue from locally generated ad valorem property taxes levied on real and personal property and the net proceeds of mining. Total revenue reached a record high of $16.6 million in 2008-2009, more than twice the revenues available three years earlier (Table 3.17-20). Like Eureka County's revenue, much of the increase was due to net proceeds of mining taxes, with a spike in such revenues in 2008-2009 due in part to the one time change in the timing of collection and disbursement of taxes on net proceeds of mining. Total revenues declined to $14.4 million the following year. Ad valorem taxes typically account for more than 75 percent of the ECSD's annual revenue, with 85 to 90 percent of that tied to mining.

Change in economic times along with historical declines in enrollment reflect underlying demographic trends that resulted in a challenging environment for the school board, ECSD administrators, faculty and staff in past years as they collectively strove to maintain quality public education in Eureka County. The ECSD's total staffing level declined by one-third between the 2000-2001 and 2002-2003 school years, and the total annual expenditures budget fell to $3.74 million in 2002-2003. The cuts reflected the effects of falling enrollments on allowable expenditures and reductions in mine-related property tax revenue to fund discretionary programs, faculty, and other costs. Although some savings accompany enrollment decline, facility operating and maintenance costs, transportation costs, and those costs required to provide

a core curriculum are less variable. Due to the remoteness of the schools, housing shortages and other factors, the ECSD salaries are among the highest in the state.

Table 3.17-20: Eureka County School District Revenues, Fiscal Years 2005-2006 to 2009-2010

Revenue Source	Revenues by School Year (In Dollars)				
	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
Local - Ad valorem	5,029,025	5,423,379	7,713,820	13,901,984	12,162,570
Local – Other	1,665,870	1,140,900	2,703,817	2,432,882	2,091,693
State and Federal Programs and Grants	410,600	277,600	94,861	224,842	135,950
Total Revenue	**$ 7,105,495**	**$ 6,841,879**	**$ 10,512,498**	**$ 16,559,708**	**$ 14,390,213**

Source: BCLLC/SDLLC 2008; ECSD 2009 and 2010.

More recently, enrollment has climbed, supporting increases in allowable expenditures. Increases in the number of junior/senior high students in Beowawe and Crescent Valley also contributed to increases in the amount of tuition paid to the Lander County School District and to higher transportation costs. As a consequence, the general fund operating expenditures of the ECSD grew from $4.35 million for the 2005-2006 school year to just over $7 million in the 2009-2010 school year (Table 3.17-21).

Table 3.17-21: Eureka County School District Expenditures

Expenditure	Expenditures by School Year (In Dollars)				
	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
General Fund:					
Regular Programs	$ 1,801,605	$ 1,928,895	$ 2,472,146	$ 2,327,334	$ 3,311,024
Vocational and Other Programs	269,779	314,145	465,696	511,550	609,930
Undistributed and Food Service	2,288,392	3,027,741	2,926,747	3,395,819	3,121,760
General Fund Operating Expenditures	**$4,359,776**	**$5,270,781**	**$5,864,589**	**$6,234,703**	**$7,042,714**
Capital / Debt Service	5,601,015	5,582,088	2,096,197	1,331,528	2,087,700
Total Expenditures 1	**$ 9,960,791**	**$ 10,852,869**	**$7,960,786**	**$7,566,231**	**$9,130,414**

[1] These totals exclude transfers to reserve fund balances.
Source: BCLLC/SDLLC 2008; ECSD 2009 and 2010.

In addition to the general fund expenditures, the adopted budget for the 2005-2006 school year contained a total of $5.6 million in capital outlays and debt service. Capital and debt service outlays were just over $2 million during the 2009-2010 school year. The ECSD, like Eureka County on the whole, has taken advantage of the economic prosperity associated with the resurgence of mining to undertake major capital improvements without incurring excessive long-term debt. In 2004, the ECSD gained electorate approval to issue $6 million in long-term debt. Proceeds from the debt issuance funded renovations at the high school, including replacing three portable classrooms in order to stem increasing utility and maintenance costs, integrate classroom spaces with the existing structure and improve the overall functionality of the educational environment. Higher than anticipated construction costs for relocation of the bus barn and vocational shop facilities pushed the total cost for the renovations to over $8 million

(BCLLC/SDLLC 2008). As a result of multi-year high revenues from taxes on the net proceeds of mining, the bonded indebtedness used to build those facilities was retired in 2010.

3.17.2.2.6 Social Conditions and Affected Publics

This section generally describes existing social conditions in Eureka County and groups that could be affected by the Project. Information for this section was obtained from interviews (between 2006 and 2008) with local officials, County staff and local residents, and from a review of secondary sources (BCLLC/SDLLC 2008).

Southern Eureka County, including the Town of Eureka and Diamond Valley, is a close-knit community where many residents know each other because of their long association with the community. There are a number of multi-generational families in the community, some whose roots date back to the original settlement of the area by people of European descent. Many southern Eureka County residents are deeply involved in the community. It is not uncommon for an individual to be a hay grower or business person, serve as an elected official or be an appointed member of a board or committee and also serve as a member of a VFD, search and rescue team, or other civic organization.

Although the Town of Eureka hosts tourists and highway travelers during summer months and periodic influxes of mine workers from area mines, it remains a town that endeavors to maintain its small town traditions and lifestyles. Many residents enjoy knowing many of their neighbors and value the low crime rate, and the slow paced, casual atmosphere of the town.

On the other hand, some community members are concerned that many of the community's youth move away to find suitable employment and would like to have a somewhat larger student body at the high school to support a broader curriculum. The narrow range of commercial, dining and entertainment options is a drawback for some residents.

The Project mine/milling facility is a large project relative to the population base in southern Eureka County. Consequently virtually everyone in southern Eureka County would likely be affected by the Project to some degree.

Specific public and groups identified during scoping and interviews as potentially affected by development and operation of the mine include:

- Individuals and businesses that provide goods and services to the mining and construction industries and to the population at large;
- Eureka County residents who are unemployed or underemployed and families with children who might otherwise leave the community to seek employment;
- Southern Eureka County residents who have low or fixed incomes, such as senior citizens and individuals and families who receive public assistance;
- Diamond Valley farmers, most of whom grow alfalfa, meadow hay or other grasses. Much of the Diamond Valley crop is marketed as high quality dairy and export grade hay. Diamond Valley producers are keenly interested in maintaining the current quantity and quality of

ground water that these agricultural enterprises rely upon and are concerned about the effect of ground water withdrawals on their farming operations;

- Grazing operators who run cattle on two BLM grazing allotments that include portions of the Project Area and in Kobeh Valley;
- Businesses that support farming and ranching; and
- Recreation users of the area around the Project. These users mainly include hunters, some OHV users (ATV and snowmobile) and visitors, re-enactors and supporters of the Pony Express National Historic Trail, which traverses the Project Area.

3.17.3 Environmental Consequences and Mitigation Measures

3.17.3.1 Significance Criteria

The NEPA (Section 1508.14) states that "...economic or social effects are not intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement would discuss all of these effects on the human environment." This means that social or economic differences are not enough to result in a potentially significant adverse effect, but they need to manifest themselves with some physical change, as described in the NEPA (Section 1508.8(b)), "...effects may include growth inducing impacts and other effects related to induced changes in the pattern of land use, population density or growth rate."

The Proposed Action would be considered to have a significant effect on social and economic values if the following occurred:

- Substantial long-term change in any sector of the local economy, such as major expansion or contraction of employment, output or diversity;
- An increase in temporary or resident populations that would unduly strain the ability of affected communities to provide housing and services or otherwise adapt to growth-related social and economic changes;
- An aggregate change in public sector revenue and/or expenditure flows likely to either compromise the ability on the part of affected units of government to maintain public services and facilities at established service levels, or allow for improved services without increasing the tax burdens on existing taxpayers; or,
- Permanent displacement of residents or users of affected areas that would result from project-induced changes in or conflicts with existing uses or ways of life.

The significance threshold would be triggered if any one of the above criteria were satisfied.

3.17.3.2 Assessment Methodology

The social and economic characteristics of the Study Area and socioeconomic aspects of the proposed Project were analyzed to determine potential effects or impacts of the Proposed Action and alternatives on employment, income, population, housing, public infrastructure and services and social conditions. Fiscal effects were assessed based on information obtained from EML and Eureka County.

Due to the dynamic nature of economic conditions in Eureka County, the nation, and the small number of recent mining operations in southern Eureka County, assessing social and economic effects of the Proposed Action and alternatives is challenging. The assessment is based on the Project's location, existing labor force and housing conditions, and recent southern Eureka County mining experience, adjusted for the differences in size, mine location, and Project duration.

Economic conditions have changed substantially since the preparation of the 2008 Socioeconomic Assessment (BCLLC/SDLLC 2008). The regional economy was robust during 2007 and early 2008, but at the time of the 2010/2011 update there were increased levels of unemployment locally, with substantially higher unemployment rates across the State of Nevada and the nation. The implications of higher unemployment for the socioeconomic effects of the Project are unclear. On one hand, there is a larger, albeit still relatively small, pool of unemployed workers in Eureka County and adjacent counties, increasing the potential that locals and daily commuters would fill direct and secondary jobs associated with Project construction and operations, if these conditions persist. On the other hand, continuing high unemployment levels across the state and nation could mean that more non-local unemployed workers would be willing to relocate to the Town of Eureka or surrounding communities for the possibility of work. It is uncertain whether more or fewer workers would be willing to relocate their families or commute weekly than was anticipated in the 2008 Socioeconomic Assessment (BCLLC/SDLLC 2008).

This assessment focuses on the 18-month construction phase and the first nine years of production operations, a period when the mine would achieve and maintain full production, creating long-term steady job opportunities conducive to household relocation and to the creation of indirect and induced jobs in the community. This is the period when the major socioeconomic effects and need for community response would be anticipated. The assessment includes a brief discussion of the Project effects of subsequent changes in operation beyond the first nine years of operations; however, socioeconomic effects are not analyzed in detail because they are anticipated to occur gradually over an extended period of time and the capability and capacities of the community would have changed in response to the intervening growth, making such an assessment highly speculative.

The residency patterns for EML workers developed for the 2008 Socioeconomic Assessment assumed that EML would facilitate the development of both temporary and long-term housing in the Eureka Canyon subdivision, such that most construction and operations workers would find accommodations in southern Eureka County. This assumption also made it likely that the bulk of Project-related population growth and demand for local government and public facilities and services would occur in southern Eureka County. Although the site plan for the Eureka Canyon subdivision contains areas designated for construction worker housing facilities and for multi-family and single family units and lots that could house operations and secondary workers, the

anticipated development schedule of the subdivision, other than construction of 66 units to accommodate demand unrelated to the Project, has not been announced as of mid-2011.

Given that the plans, timing and pace of housing development in southern Eureka County are as yet unresolved, it is uncertain whether adequate housing would be available to accommodate the Project-related population forecast in the 2008 Socioeconomic Assessment during Project construction and the initial months of Project operations. A potential response to such a housing shortage would be that more construction and operations workers would commute on a daily basis from other, more distant communities. Fewer workers in southern Eureka County would mean that the short-term demand for community infrastructure and services described in the 2008 Socioeconomic Assessment would be overstated. Conversely, Project-related demand for housing and local government infrastructure and services would occur in communities outside of southern Eureka County. Through the construction period, demand in other communities would be temporary and likely extend to a limited range of infrastructure and services. Some of the long-term demand associated with Project operations would also be temporary, until adequate housing was developed in southern Eureka County.

Even if adequate housing became available in southern Eureka County, the experience of the Ruby Hill Mine and other mines in Nevada suggest that some Project workers would commute to the Project daily from other communities. Two categories of daily commuters would be anticipated: existing residents of those communities who would not generate additional demand for housing or public services in their home communities, and non-local construction and operations workers who choose to locate in communities outside southern Eureka County and commute on a daily basis. The number of non-local daily commuters would likely be small in comparison to the populations of the host communities and result in minimal socioeconomic effects. Potential effects on communities outside of southern Eureka County by relocating Project workers are discussed in subsequent parts of the socioeconomic analysis.

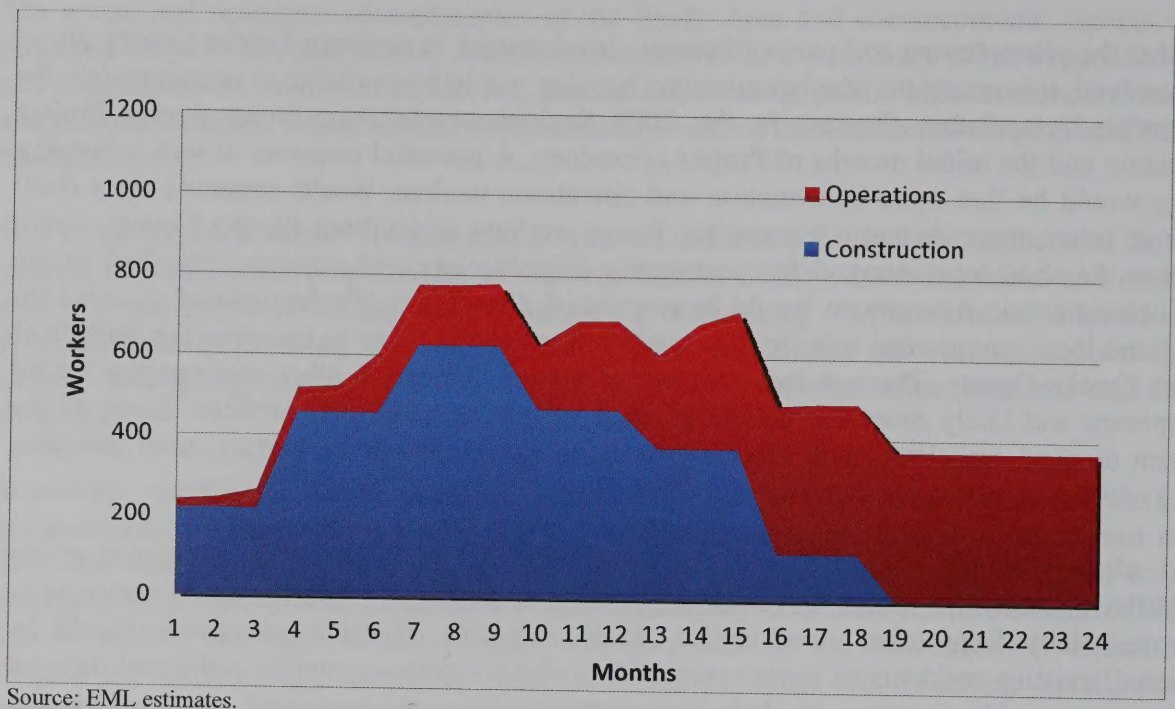
In consultation with Eureka County, a SA was conducted to supplement the 2008 Socioeconomic Assessment, as noted in Section 3.17.2.1; Study Methods (see Appendix **E**). The SA examined the secondary employment, population and school enrollment effects of differing operations workforce residency, labor participation, and demographic assumptions than those contained in the 2008 Socioeconomic Assessment. The SA results are expressed in terms of population and school enrollment and the implications of the SAs are included under those topics and also considered under Section 3.17.3.2.3 Housing Effects, Section 3.17.3.2.5 Public Utilities and Services Effects and Section 3.17.3.2.6 Public Fiscal Effects.

For the Slower, Longer Project Alternative and Partial Backfill Alternative, the assessment methodology is based on data provided by EML in a memorandum dated January 24, 2011 (EML 2011).

3.17.3.3 Proposed Action

The proposed Project would have an estimated 18 **to 24** month construction period, followed by a 44-year production life. Figure 3.17.2 in the following section provides a timeline and workforce loading schedule for Project construction and the first six months of Project operations. Figure 3.17-3 provides an operations workforce loading schedule over the estimated production life of the Project.

Figure 3.17.2: Estimated Mount Hope Construction and Operations Workforce, First 24 Months After Project Initiation



Source: EML estimates.

Increases in Proposed Action-related employment and population are discussed in detail in the Socioeconomic Assessment (BCLLC/SDLLC 2008) and are summarized in the following sections.

3.17.3.3.1 Economic and Employment Effects

The Project would generate three types of employment:

1. Workers in a variety of construction crafts would be required to construct mine facilities. Mine construction would be performed by an engineering, procurement, and construction management contractor, and a number of specialty sub-contractors.
2. A wide variety of managerial, administrative, technical, skilled, and unskilled workers would be needed to operate the mine during the production phase.
3. Purchases of goods and services by the mine, contractors, suppliers, and by mine construction and operations employees would generate additional jobs across all sectors of the local and regional economies.

Figure 3.17.2 displays projected construction and operations employment for the 24 months after Project initiation.

Employment During Construction

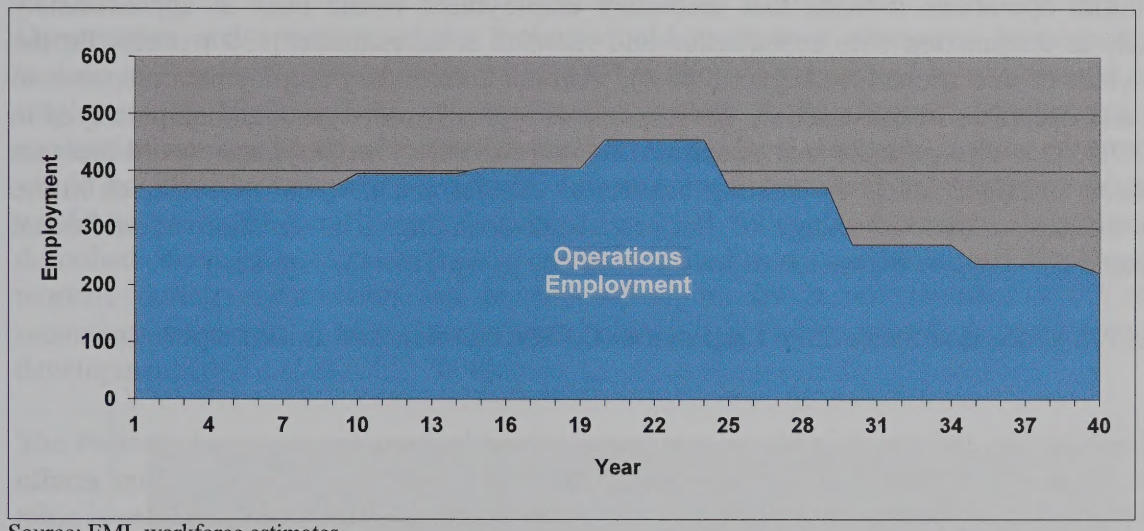
Projections provided by EML (BCLLC/SDLLC 2008) indicate that on-site construction would begin with approximately 220 workers, expanding over time until peaking at over 600 workers during completion of the mill and processing facilities in the third quarter of construction. The estimated construction workforce would average nearly 400 workers over the 18-month period.

EML would also begin employing operations workers during Project construction (see Figure 3.17.2). Project direct operations employment would total approximately 20 workers as construction begins, increasing to the full operations compliment during the last two months of construction. Over the first 24 months of construction and operations, direct on-site employment would result in an average of approximately 567 jobs. There would be a three month peak where a total of approximately 775 combined construction and operations workers would be on site, starting around the seventh month of construction.

Employment During Production Operations

After construction is completed, EML anticipates operations employment of approximately 370 employees for nine years, at which time the number of workers would gradually build to 455 in Year 20, remain at that level for five years, and then gradually decline to approximately 220 in Year 40 (Figure 3.17.3).

Figure 3.17.3: Estimated Mount Hope Operations Employment



Source: EML workforce estimates.

Although the size of the Project workforce and the highly specialized occupations needed for some mine construction and operations activities would dictate a need to recruit non-local labor for initial mine operations, it is likely that some southern Eureka County residents would leave their current employment to work at the Project, as discussed in the Labor Competition and Job Shift section, below.

Secondary Employment

Economic data for northeastern Nevada indicate each mining construction job supports approximately 0.6 secondary job in the region and approximately 1:1 secondary jobs supported by each permanent mining job (Fadali et al. 2005). Secondary employment includes two types of non-direct employment:

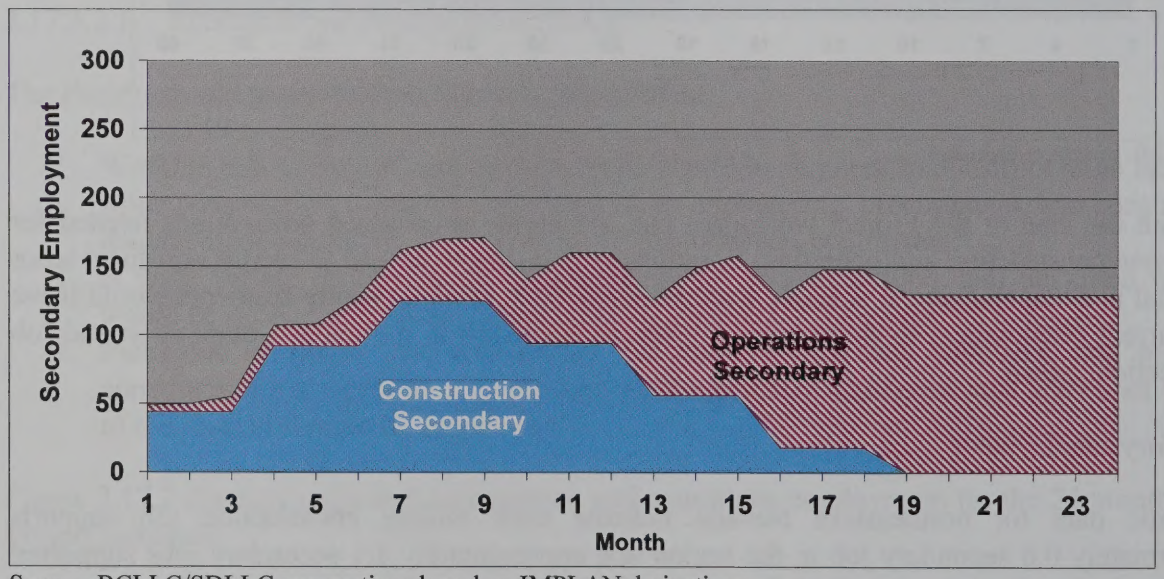
- Indirect employment includes jobs supported by EML and contractor purchases of goods and services from local and regional businesses. Although EML would purchase goods and services in Eureka County, most construction and mining supply and service firms are located in Elko or Reno (BCLLC/SDLLC 2008).

- Induced employment includes jobs supported by employee spending of Project-related income and by business, local government, and school district spending in response to increased demand. Induced employment would occur across many economic sectors.

A large share of the induced demand associated with the Project would be satisfied by businesses in Elko, Reno, and elsewhere due to the limited availability of goods and services in the Town of Eureka, purchases made via mail order and the internet, and outflows associated with single status workers who would make retail and service purchases in their home town (BCLLC/SDLLC 2008). Over time, the Town of Eureka's local retail and service sector would likely expand in response to the increased demand associated with the Project. However, even with the economic infusions from these two mines, Eureka's commercial sector would be unable to support the range of retail and service establishments offered in Elko and Reno. Considering the above, the local secondary economic multipliers used for this assessment is 0.22 job per direct job during construction and 0.35 job during production (BCLLC/SDLLC 2008).

Project-related local secondary employment estimates from the beginning of construction through initial operations indicate that secondary employment would peak at approximately 170 workers in conjunction with construction and stabilize at an estimated 130 workers for the first nine years of operations (see Figure 3.17.4).[6] Although secondary employment responds to increases and decreases in construction, the response is typically more gradual than portrayed in Figure 3.17.4. It is also possible that operations-related secondary employment would increase beyond these estimated levels as existing businesses expand and new businesses open in the Town of Eureka to take advantage of Project-related spending. The creation of additional housing could also support expansion of local businesses in the Town of Eureka.

Figure 3.17.4: Estimated Secondary Employment: Construction and Initial Operations



Source: BCLLC/SDLLC assumptions based on IMPLAN derivations

[6] **These jobs are soon to be filled by: 1) individuals currently living in southern Eureka County; 2) individuals relocating to southern Eureka County specifically for these jobs; and 3) household members of Project employees that move to southern Eureka County. These secondary employment impacts are discussed in Section 3.17.3.3.2 and Appendix E.**

Labor Competition and Job Shift

Once operational, the Project is likely to be an attractive employer for local residents. Jobs in the mining industry typically pay well with substantial benefits, and the anticipated 44-year mine life would offer opportunities for long-term employment. Operations job categories include management, administrative, maintenance, and security, as well as skilled and unskilled labor, providing a variety of job opportunities. Given the Project's proximity to the Town of Eureka, some currently employed local residents may seek employment at the Project. Consequently, Eureka County, the ECSD, and local businesses may lose some employees to the mine and may have difficulty recruiting new employees given the lower wage scale of local businesses and government. Competition for housing and high housing costs could compound the difficulties that the County, ECSD, and local businesses could face in attracting new employees during construction and initial operations. Current housing shortages may be eased over time by ongoing efforts to develop new housing, both in conjunction with and independent of the Project.

Personal Income

Construction and operation of the Project would result in a substantial increase in personal income in Eureka County. An estimated $101 million in wages and salaries would be paid to employees by EML and its construction contractors during Project development and pre-production mining. Much of that total would leave the local economy as most construction jobs would be filled by temporary residents; however, local purchases by the mine and employees would support additional personal income for local residents. Assuming the secondary jobs described above, supported by local construction and mine purchases and local spending by workers during construction and pre-production, results in an estimated $10.8 million in secondary income for Eureka County households during Project construction and pre-production development (BCLLC/SDLLC 2008).

The Project's long-term mining and production phases would also generate substantial secondary effects on personal income. Based on EML labor cost estimates, direct annual payroll of the mine is projected to average approximately $33.4 million at full production, varying over time in response to changes in the size of the work force, wage rate, and salary pressures in response to competition for labor. Local spending by workers, combined with an allowance of $7 million in local purchases by the mine (approximately five percent of the annual non-labor operating costs, excluding royalties and taxes), would generate approximately $3.6 million in local income annually. It is estimated that just over half of the $37 million in annual combined direct and secondary income would accrue to Eureka County residents, which is 28 percent of the $65 million realized by local residents in 2008. Moreover, the strong job market would likely translate into higher labor earnings and per capita incomes for other local households as well.

Effects on Other Sectors of the Local Economy

The economic activity associated with construction and operation of the Project would provide additional earnings for businesses in other sectors of the Eureka County economy; however, competition for labor could initially constrain the capacity of some businesses to take advantage of the increased economic activity during Project construction and the initial years of Project operations.

Businesses providing goods and services to tourists and recreation visitors could be affected by the Project, particularly during the construction phase. Many retail and service establishments geared toward tourists (i.e., lodging, dining, entertainment, automotive services, and groceries) would likely to be patronized by employees and vendors associated with the Project during construction and experience increased sales associated with the year-round demand. Businesses catering specifically to tourists and recreation visitors (gift shops, tourist attractions, etc.) may be indirectly affected during the short term if competition for motel and RV park spaces impacts tourism visitation, although it is likely that visitors that pass through Eureka County but do not stay in the town would be likely to continue to patronize these businesses. After the construction phase of the Project is completed and competition for motel rooms and RV spaces eases, any detrimental effects on tourist-related businesses should substantially decrease. Although recreation users would be displaced from a portion of the Project Area (Section 3.15), there are ample similar lands within the County. Consequently these users are likely to shift their use to other areas of Eureka County, resulting in no net change to Eureka County recreation businesses.

Section 3.12 describes effects on the levels of livestock grazing supported on public lands **and potential impacts to forage on private lands**. The effects on grazing, expressed in terms of a reduction in AUMs, would result from Proposed Action-related disturbance, exclusion and ground water drawdown. Reductions in the number of AUMs would reflect an economic loss for affected grazing operators, which **may** be mitigated. **Specifically, total economic impacts could be an annual reduction of $41,705 (1999 dollars) ($57,597 in 2012 dollars) as documented in Section 3.12.3.3.** Mitigation would also be available for Project-related effects on **reductions of forage for livestock grazing resulting from the ground water drawdown as discussed in Sections 3.2.3 and 3.9.3. Anticipated impacts from the implementation from these mitigation measures are discussed in their respective sections.** Reductions in AUMs of livestock grazing would also represent a loss for the agricultural service sector of the Eureka County economy, which would not be mitigated. Section 3.12.3.3 of this EIS outlines the specifics of the economic effects of the loss of AUMs. However, the projected reductions of grazing AUMs would represent a small portion of the overall AUMs in the County and would, therefore, not represent a substantial adverse economic effect. **A large body of research has shown that public land grazing permits increase the property value of the ranch holding the permit, in most cases. Various factors have been explored to explain this effect. Significantly, the research has found that the added forage and relatively low permit fees for grazing on public lands do not entirely explain the increase in property value associated with the permit itself. Research has found that the added acreage associated with a public land permit is perceived as adding semi-private open space to the property and thus increases the value of the ranch. Examples of this research include Rimbey et al. (2007) and Torrell et al. (2005). This perceived value cannot be quantified. The permanent displacement of 32 AUMs associated with the open pit would unlikely affect any premium to the property value of the current permittee's ranch associated with the permit.**

During public scoping and in subsequent meetings and interviews, Diamond Valley farmers expressed concern about potential adverse impacts on agricultural production resulting from the proposed Project's impact on ground water resources. Based on the findings discussed in Section 3.2, there should be no affect to ground water levels in Diamond Valley and, consequently, no correlative economic effects to the farming industry from increased costs or diminished production. The proposed Project could impact ground water levels in the Kobeh Valley, which, if unmitigated, would likely adversely impact future **crop (i.e., alfalfa)** production of ranching and grazing operators that depend on these ground water resources. Mitigation has been

developed (as outlined in Section 3.2.3.3 and Appendix **D**) that would minimize impacts to ground water and surface water users in Kobeh Valley. Assuming these mitigation measures are fully implemented, no economic effects to the farming industry from increased costs or diminished production would be anticipated in the Kobeh Valley.

In all, the direct, indirect and induced economic and employment opportunities associated with the Project would provide a substantial local and regional economic stimulus and contribute to a favorable labor market for local workers and the unemployed. The Proposed Action would create substantial demand for labor, which would be considered beneficial on a regional level. On a local level, the Project would result in labor competition among employers. From a worker's perspective, competition may be viewed as beneficial, resulting in upward pressure on wages, and providing job advancement and job mobility opportunities. From an employer's perspective, competition could result in employee turnover and additional wage expenses. Based on the findings of the environmental analyses and the suggested mitigation measures developed for this EIS, the Proposed Action would likely have minimal adverse effects on other sectors of the economy.

- **Impact 3.17.3.3-1**: The Proposed Action would result in substantial long-term expansion of most sectors of the southern Eureka County economy, especially the mining, retail and service sectors. The construction sector would also undergo substantial expansion during Project construction and the initial years of operations as local housing, commercial and community infrastructure is built to accommodate the Project workforce. The Project-related economic and employment opportunities would be seen as beneficial by many at the regional and local levels. Locally, the substantially increased labor demand during construction and the initial period of operations could result in competition for workers and upward pressure on wages, primarily during Project construction and early operations, which could be seen as adverse for some public and private sector employers, particularly those that would not benefit economically from development of the Project. For local and regional residents, the increased opportunity for high-paying employment would be considered beneficial.

  There is potential that competition for motel rooms and RV parks could affect businesses that depend specifically on tourism and recreation visitors (e.g., gift shops and tourist attractions) but those effects would likely be temporary during the construction phase of the Project.

  There has been concern among Diamond Valley agricultural interests that the Project could affect the quantity of water available for irrigation, which would in turn result in adverse effects on the agricultural sector of the local economy. The monitoring and mitigation measures outlined in Sections 2.1.16 and Section 3.2 of this EIS are intended to avoid or reduce potential adverse effects on ground water in Diamond Valley.

  The Project would diversify the local mining sector by adding a new commodity.

  Significance of the Impact: The degree of this impact is considered significant. Impacts would be both beneficial and adverse. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.3.2 Population Effects

Construction and operations of the proposed Project would substantially affect population in southern Eureka County. As detailed above, the Project's direct employment requirements exceed the capacity of the local (southern Eureka County) labor force, which would trigger substantial relocation to the area to fill temporary construction jobs, most of the permanent mine operations, and many of the secondary jobs created by the Project and employee spending.

Table 3.17-22 displays the residency assumptions for the three categories of Project-related workers. These assumptions reflect professional judgment based on the size of the southern Eureka County labor force, the distance from the Project to other communities, the number of active mines in northern Nevada and associated mine support industry, the experience of other Nevada mines in rural areas, and housing availability in southern Eureka County[7].

Table 3.17-22: Mount Hope Project Workforce Residency Assumptions, Percent of Workers

Residency Status	Construction	Operations	Secondary
Local	5%	10%	5%
Daily commuters	15%	15%	0%
Single status weekly commuters	75%	40%	0%
Relocating w/ households	5%	35%	45%
Household members of relocating workers	0%	0%	50%
Totals	100%	100%	100%

Source: BCLLC/SDLLC 2008

The residency status of the construction, operations, and secondary workforces and the household characteristics of those workforces would be the primary drivers of Project-related population change in southern Eureka County. Housing effects are assessed in the following section (3.17.3.3.3). The availability of housing, or lack thereof, would be a major, but not the sole, determinant for workforce residency decisions during both the construction and operations phases of the Project. Some workers at other mines in remote locations of rural Nevada choose to commute to those mines from larger, more distant communities on either a daily or weekly basis (Personal Communication, Randy Buffington, Homestake Mining Company 2007; Vogt Santer Insights 2011). These daily commuters may choose to commute from these communities because they have existing residences there, or more distant communities offer a broader range of housing options, offer expanded shopping and health care alternatives, a wider range of employment opportunities for spouses, or other important social or lifestyle features.

The following population forecasts are generally based on recent experiences in southern Eureka County, adjusted for the location and size of the Project (BCLLC/SDLLC 2008). However, there is considerable uncertainty regarding the number of workers who would relocate to southern Eureka County. Consequently, the population assessment and subsequent parts of this section discuss the potential effects of different workforce residency and commuting patterns than those assumed for the forecasts.

[7] Note that unemployment levels were substantially higher at the time this EIS was prepared than during the preparation of the 2008 Socioeconomic Assessment. One possible implication of the change is that more local workers may be available for employment at the Project or in the secondary workforce and more workers would be willing to commute to the Project from their home communities on either a weekly or monthly basis. Conversely, higher levels of unemployment might mean that more workers are willing to relocate to the Study Area for work.

Construction Phase Population Effects on Southern Eureka County

Population gains associated with the construction phase of the Project would be comprised of the following categories:

- single status construction workers, who by definition, would have a household size of one;
- a small number of construction workers who relocate to the area with households and who are assumed to have an average household size of 2.64[8];
- single-status operations workers who choose to commute to the area on a weekly basis, who by definition would have a household size of one;
- operations workers who relocate to the area with households, who are assumed to have an average household size of 2.64[9]; and
- secondary workers who relocate to the area with households, who are assumed to have an average household size of 1.9, to reflect the anticipated higher level of single persons and younger households due to the lower salaries associated with secondary employment and lack of housing, particularly during the construction phase[10].

Figure 3.17.5 displays the estimated incremental mine-related population gains in southern Eureka County during the construction phase of the Project, by worker residency and household status. These combined non-local construction, operations, and secondary worker populations yield an average incremental weekday population gain of nearly 700 persons over the 18-month construction phase, with a peak population of approximately 900 residents during the third quarter and again in month 15 of construction.

As stated in Section 3.17.2.2.1, the 2010 Census population for southern Eureka County was 1,351. Thus, the average increase in population during Project construction represents about 50 percent of 2010 southern Eureka County population, with increases of nearly 67 percent during the peak quarter.

Operations Phase Population

The 2008 Socioeconomic Assessment assumed that 55 percent of the operations workforce would commute from outside Eureka County (15 percent on a daily basis and 40 percent on a weekly basis), which is similar to current mine operations in southern Eureka County (BCLLC/SDLLC 2008). Given the tight housing market conditions expected during early operations, weekly commuters are unlikely to be accompanied by other household members. The number of commuters may diminish over time, depending on the availability of housing, the

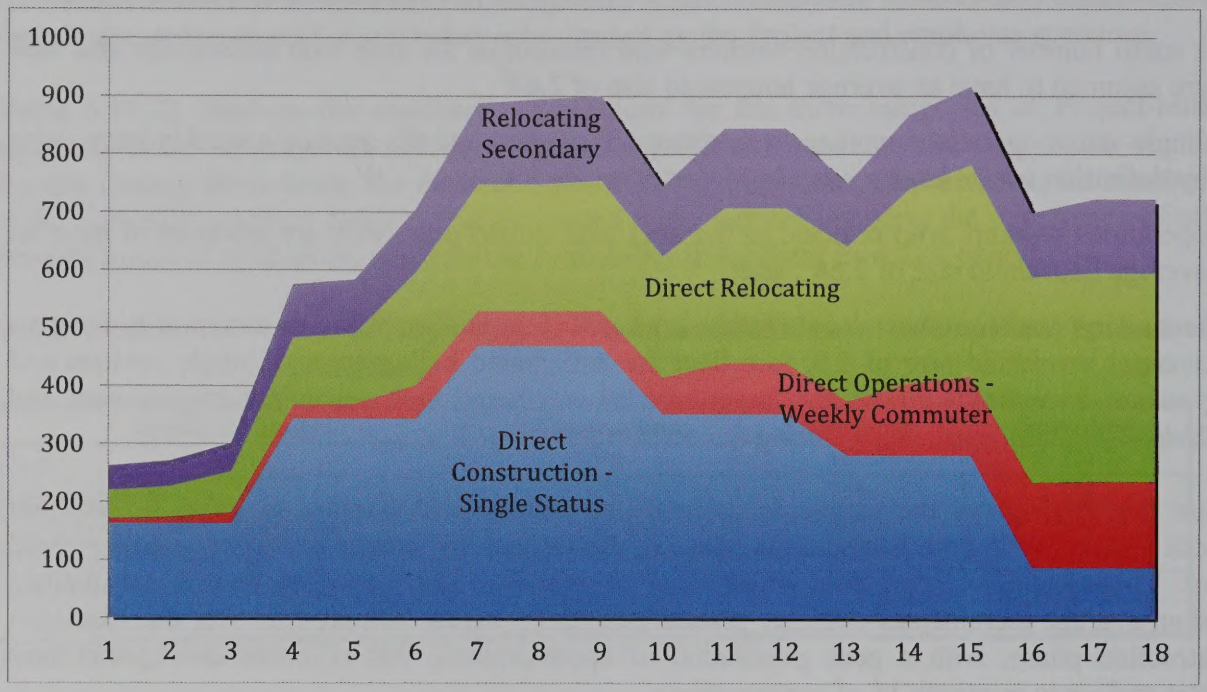
[8] The 2000 Census average household size for Nevada was 2.62 persons per household. The 2010 average was 2.65. Experience has shown that few construction workers relocate their families with children for short-term (one- to two-year) projects (Personal Communication, Gamble, Lander County School District 2006; Personal Communication, Ben Zunino, ECSD 2006). Therefore a household size factor approximating the statewide Nevada average is a conservative assumption.

[9] Relocating operations workers will likely include many single and two person households, particularly during the early years. Consequently a household size factor approximating the statewide average is a conservative assumption.

[10] Retail and service sector jobs and many non-professional government and school district jobs pay substantially less than many mining jobs. Given the anticipated shortage of housing during construction and early years of Project operations, many in-migrating workers are likely to be single status or households comprised of two working adults (BCLLC/SDLLC 2008). Therefore a secondary worker average household size of 1.9 is a reasonable assumption.

commercial sector response to population growth in southern Eureka County and evolving regional and national economic conditions.

Figure 3.17.5: Mount Hope Construction Population Impact by Worker Residency and Household Status



Source: Source: BCLLC/SDLLC based on EML workforce estimates
Note: The "Direct Operations – Weekly Commuter" category includes operations workers who are assumed to commute to the Town of Eureka without other household members on a weekly basis and live in southern Eureka County during the workweek. The "Direct Relocating" category includes construction and operations employees who relocate to southern Eureka County with households.

The operations workforce for the Project that does relocate to Eureka County would be expected to have different household characteristics than the construction workforce. Some would be single or married but with few or no children. However, the prospect of long-term employment would likely attract a larger share of married workers who choose to relocate their spouses and children to the area.

As noted above, the operations workforce and associated population would begin to arrive in southern Eureka County during Project construction. The operations-related population would be low during the first month of construction and would include EML employees already living in the Town of Eureka. This incremental population would build to an estimated 634 persons during the final two months of construction.

During the first nine years of operations, the Project workforce would decline when compared to the construction phase. Correspondingly, mine-related population gains, including both direct and secondary effects, in southern Eureka County would be approximately 600 persons, approximately 16 percent lower than the average construction population of 695 and 33 percent less than the peak construction population. The reductions in population would stem largely from the relocation of single status construction workers after the completion of construction.

Future cutbacks in direct employment (in approximately Year 35 of operations) would occur in response to reductions in the tonnages of waste and ore moved, possibly triggering population out-migration. The level of out-migration would depend on the specific demographics of the affected households, but it is estimated that the out-migration would result in a remaining Project-related population of between 351 and 472 residents, decreasing further to between 168 as the Project enters final production and reclamation at approximately Year 40 of operations.

Operations Population Sensitivity Analysis

In its role of a cooperating agency, Eureka County expressed concerns regarding the demographic factors underlying the projected incremental population in the 2008 Socioeconomic Assessment. Subsequently, those factors were reviewed in consultation with the County, the results of which were incorporated into a SA to assess the potential effects of alternative economic, demographic factors and residency assumptions on the estimates of total resident population and school age children. Specifically, the SA was comprised of three alternative sets of assumptions; labeled SA 1, SA 2, and SA 3. [11] The SA also addressed Eureka County's concern regarding the potential for jobs in the local economy vacated by workers who chose to work at the mine to be filled by higher local labor force participation and the resulting expansion of the local labor force. Results of the SA were submitted to the BLM in a 2009 memorandum included as Appendix **E** of the EIS.[12]

Table 3.17-23 summarizes the results of the **SA** during the first ten years of operations, a period when the mine would achieve and maintain full production, creating long-term job opportunities conducive to household relocation, and to the creation of indirect and induced jobs in the community. As shown, the range of long-term projected population effects range from 584 to 795 residents, including weekly commuters, with a corresponding increase of between 83 and 161 school age children. The population and school enrollment projections contained in the 2008 Socioeconomic Assessment (BCLLC/SDLLC 2008) are presented as the Base Case, to provide a point of comparison for the **SA**.

The **SA** demonstrates that the population estimates are moderately sensitive to the changes in assumed labor force participation, workers per household and in-migrating workers. Differences in incremental population projections associated with SA 1, SA 2 and the 2008 Socioeconomic Assessment (the Base Case) are relatively minor plus 12 and minus three percent respectively.

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[11] SA 1 assumes the share of secondary jobs filled by relocating households would be 50 percent and the share filled by spouses/partners would be 45 percent compared to 45 percent and 50 percent respectively in the 2008 Socioeconomic Assessment. This analysis also assumes that existing local jobs vacated by workers who accept jobs at the mine would be filled by additional relocating worker households. The Base Case scenario did not assume that vacated jobs would be filled by non-local workers.

SA 2 assumes 30 percent of Mount Hope operations workers relocate to southern Eureka County compared to 35 percent in the 2008 Socioeconomic Assessment. All other assumptions and multipliers are the same.

SA 3 assumes 50 percent of Mount Hope operations workers relocate to southern Eureka County compared to 35 percent in the Base Case. It also assumes that: the average persons per household for operations workers would be 2.85 compared to 2.64 in the Base Case; the share of secondary jobs filled by relocation households would be 35 percent compared to 45 percent in the Base Case to reflect the substantial increase in second workers associated with the increase in direct worker relocation in this scenario; and, the average household relocating to fill secondary jobs would be 2.01 persons compared to 1.90 Base Case to reflect more households relocating with families.

[12] Blankenship Consulting LLC and Sammons/Dutton LLC, Marh 20, 2009, *Supplemental information to address Eureka County concerns with the June 2, 2008, Mount Hope Project Socioeconomic Assessment.*

When all of the sensitivity factors are combined with larger changes in each factor, larger differences in the population estimates emerge. The incremental population associated with SA 3 is 32 percent (192 persons) higher than the population associated with the Base Case. (BCLLC/SDLLC 2009; Appendix **E**). Implications of the higher population projections associated with SA 3 are discussed in the Housing and Public Utilities and Services sections that follow.

Table 3.17-23: Mount Hope Relocating Operations Worker Sensitivity Analysis Summary

	2008 Socioeconomic Assessment (Base Case)	SA 1	SA 2	SA 3
Estimated relocating population **and weekly commuters**: 1st 9 years of production operations	603	678	584	795
Estimated incremental school enrollment[13]	96	106 – 122	83 – 96	140 – 161

Source: BCLLC/SDLLC 2009; Appendix **E**

Differences in population and school enrollment projections associated with the respective SAs continue through subsequent phases of operations (see Table 1 of Appendix **E**). Changing economic conditions, employee turnover at the mine, potential closures of other area mines and other factors could also play an important role in mine-related population in future years.

Effects of Higher Levels of Workforce Commuting

As discussed in Section 3.17.3.1, a shortage of housing in southern Eureka County during Project construction and the initial months of Project operations could result in higher levels of commuting from other communities than was anticipated in the 2008 Socioeconomic Assessment. Such an occurrence would result in lower incremental population growth in southern Eureka County than projected in the foregoing discussion under either the Base Case or the SAs. The reductions in population would of course be dependent on the actual number of commuting workers.

- **Impact 3.17.3.3-2**: The Proposed Action would result in substantial growth and concentration of population. Population growth would present new economic opportunities for southern Eureka County businesses and support additional commercial development. These effects would be seen as positive for some. The changes from the current relatively stable and smaller population would be seen as adverse by others.

  Significance of the Impact: This impact is considered a significant effect on social and economic values. The impact has both positive and potentially adverse, short term and long term, attributes. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

[13] The number of students enrolled in Eureka County schools is presented as a range of 20 percent to 23 percent of the permanent resident population **(i.e., relocating population).**

3.17.3.3.3 Housing

This section discusses housing demand associated with the combined construction, operations and secondary workforces during construction and the initial nine years of production operations. Housing demand generated by the Project would substantially exceed the currently available temporary and conventional housing resources in southern Eureka County.

Housing Demand during Construction

Single status construction workers would require temporary housing while working on the Project. Temporary housing accommodations to satisfy this demand might include hotel and motel rooms, RV and mobile home park pads, and temporary construction worker (TCW) housing facilities. While some construction workers might prefer rental housing, apartment, and mobile home accommodations, there is currently limited availability of such resources in southern Eureka County.

Figure 3.17.6 displays the projected combined housing demand associated with Project construction, operations and secondary workforces during the construction phase of the Project. Given the size of the anticipated workforce, there would be limited availability of temporary housing in southern Eureka County and commuting distances to other communities. EML is planning to house up to 300 construction workers in TCW housing facilities (Personal Communication, Pat Rogers, EML 2011). As noted above, Eureka County has identified land in the Eureka Canyon Subdivision for temporary housing for up to 300 construction workers and EML has expressed its intention to house workers on this site (Branstetter 2010). At their May 20, 2011, meeting, the Eureka County Board of Commissioners voted to have the County Public Works Department begin working with EML on timelines, acceptable design, and other pertinent details of the TCW housing facilities at the Eureka Canyon Subdivision (Eureka County Board of Commissioners 2011). EML also intends to house some supervisory personnel and construction management personnel in mobile homes in EML's 36-space mobile home park in the Town of Eureka.

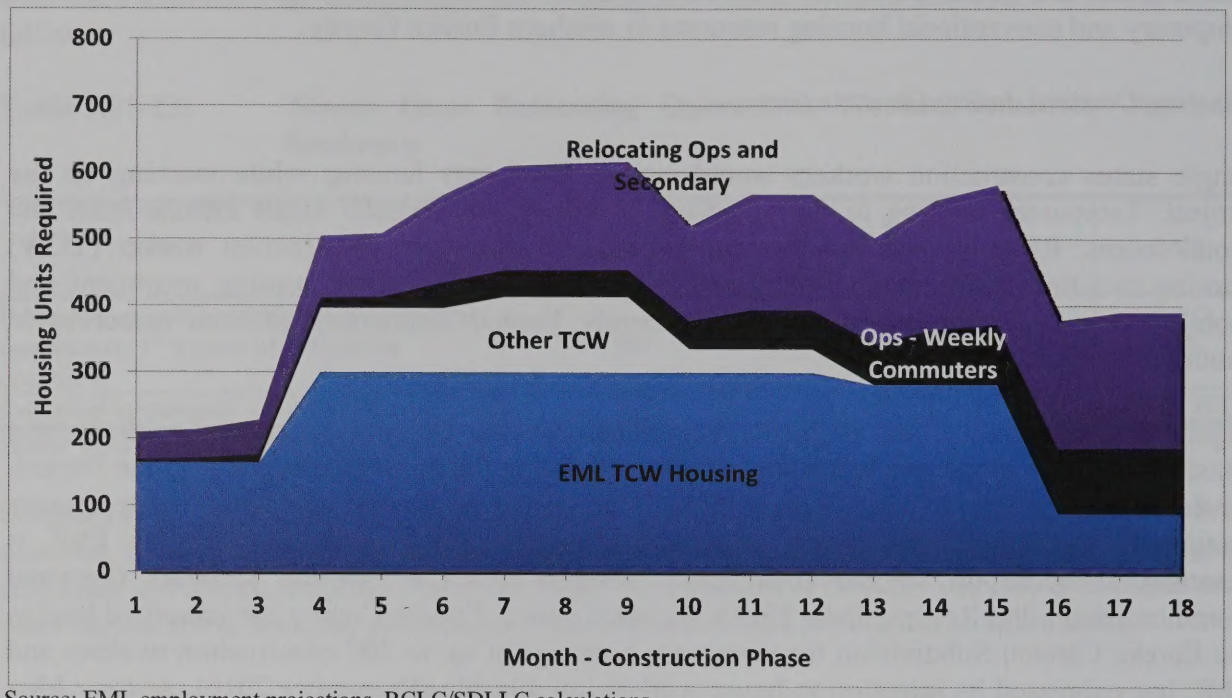
Assuming the TCW housing facility is operational as construction begins, with capacity to accommodate up to 300 workers, un-met Project-related southern Eureka County housing demand from construction and operations workers and relocating secondary workers would increase from approximately 50 units during the beginning of construction to approximately 310 units during the construction peak. After the construction peak, housing demand (excluding the TCW) would decrease slightly, increasing thereafter to approximately 350 units during the final two months of construction.

Construction Worker Housing Options

According to the construction workforce estimates and residency assumptions, EML would need to accommodate an average of 284 single status construction workers over the 18-month construction phase and a short-term peak of 470 single status construction workers in the third quarter of construction. Assuming construction of TCW housing facilities adequate to accommodate 300 workers, housing accommodations for an estimated 170 single status construction workers would still be required during the peak construction period. Single status construction workers are assumed to share non-TCW housing accommodations at an average rate

of 1.5 workers per unit, so a total of about 113 units would be needed to accommodate these workers.

Figure 3.17.6: Mount Hope Housing Demand During Construction



Source: EML employment projections, BCLC/SDLLC calculations

Based on the housing information discussed in Section 3.17.2.2.2, possible options for housing additional TCW include the following:

- Use of pads and rooms in the existing 100 RV spaces and 88 motel rooms in Eureka if available;
- Using some or all of the 30 additional RV spaces under refurbishment and construction as of summer of 2011.
- Construction of new commercial RV or mobile home parks in southern Eureka County, although none have been announced as of summer of 2011; and
- Construction of some or all of the remaining 60 multi-family units planned for the Eureka Canyon Subdivision (assuming two single status construction workers per unit, the construction of these units could accommodate approximately 120 workers). However, weekly commuting operations workers and relocating construction, operations and secondary workers may also compete for these units.

Some of the above options may not materialize or would not be adequate to accommodate the combined construction and operations workforce during peak construction periods. A shortage of adequate construction worker housing options could result in more workers seeking temporary housing in more distant communities or seeking unconventional housing options such as locating RV's on lots in the Town of Eureka or the 3rd Street Area of Diamond Valley or camping on public lands. Effects of higher levels of commuting are discussed in Section 3.17.3.3.4 (Public

Utilities and Services Effects) and Section 3.17.3.3.6 (Effects on Social Conditions and Affected Publics).

Production Operations Housing Demand

Given the estimated 44-year life of production operations, Project operations workers and secondary workers are likely to prefer conventional housing resources. Such resources include single-family homes (both "stick-built" and manufactured), multi-family homes, and apartments, and mobile homes. Some weekly commuting operations workers may also reside in RVs during their work week, particularly during the initial years of construction when conventional housing resources are likely to be limited. Based on EML employment forecasts and the labor force participation, commuting and occupancy assumptions used for this assessment, total operations-related housing demand would be 288 units during the first nine years of full production operations. This includes demand for an estimated 99 units to accommodate weekly commuters who are assumed to share units at a rate of 1.5 workers per unit and 189 units to accommodate relocating operations and secondary workers and their households. Some operations worker households would also have second workers filling local jobs and some secondary worker households will also have two working members.

Total housing demand would increase to a projected 328 units after Year 10 of operations and peak at 368 units during the five-year period coinciding with the maximum direct operating employment, which would be over 20 years after initiation of Project operations, according to current plans. Total demand would then diminish to 180 units by Year 30 of operations and drop to 97 units by Year 44.

Sensitivity Analysis Housing Demand

As discussed above (Table 3.17-23), the incremental population in southern Eureka County during the initial nine years of operations under the economic demographic assumptions in SA 3 would be approximately 32 percent higher than under the 2008 Socioeconomic Assessment or Base Case. Net housing demand under SA 3 would be 13 percent higher due to the shifts in work force composition; fewer weekly commuters and more relocating households with multiple workers. The shifts would translate into a need for fewer apartments and RV parking spaces, offset by demand for more conventional housing. Total housing demand associated with SA 3 would include demand for 62 units to accommodate weekly commuters and 266 units to accommodate relocating operations and secondary workers and their households.

Housing Resources Available to Accommodate Operations-Related Demand

Potential resources to meet some or all of the Project-related housing demand include the following:

- The County and EML had a lease agreement for the Eureka Canyon Subdivision site. Eureka County and EML formally terminated the lease in July 2010, but agreed that the site "will accommodate and include an area for **TCW** housing sites and permanent housing sites to satisfy the projected needs of the community including the projected needs of the mining Project contemplated by EMLLC" (Fiorenzi and Personal Communication, Steve Hansen, Nevada Rural Health Centers Inc. 2010).

- In July 2010 the Eureka County Commission entered into a contract for services with the Nevada Rural Housing Authority to develop housing in the Eureka Canyon Subdivision. The County's preliminary subdivision map for the site provides for 110 multifamily and 122 single-family residential units. The initial phase of development by the Nevada Rural Housing Authority includes 50 rental multifamily units and 16 single-family homes to address estimated housing needs of southern Eureka County unrelated to the Project (Johnson 2010).

- There are 47 residential lots in the Prospect Subdivision and 85 potential lots in infill areas of the Town of Eureka. A total of 112 lots could be developed in the Devil's Gate GID #2 area in Diamond Valley and an additional 122 lots in the Ruby Hill North and South subdivisions could be developed. Some of these lots are currently unserved with water, wastewater services or streets (Damele 2010).

Based on these resources, an estimated total of 598 units could be developed on potential lots in the Eureka Canyon, Prospect and Ruby Hill North and South subdivisions, in the Devils Gate GID # 2 area and in infill lots in the Town of Eureka, although not all of the latter are readily developable or on the market (see Section 3.17.2.2.2). Nevertheless, there are adequate developable lots in southern Eureka County to accommodate production operations-related demand from all sources under both the Base Case and SA 3.

Approximately 50 housing units would be needed to accommodate operations and secondary workers as construction began. The number of units needed would increase over the ensuing 18 months to a peak of about 300 units by the end of construction and initiation of production operations. While a portion of these units would likely be single or multi-family "stick-built" housing in the long run, initially, many of these units are likely to be manufactured homes. It is unlikely that the existing residential construction sector in southern Eureka County, which has recently added less than ten homes and mobile home placements per year, would be able to respond to this volume of demand in a timely manner. Complicating the rapid development of conventional housing is the fact that utilities and streets would need to be extended to some lots in order to accommodate development, and additional utility infrastructure would be required (see Section 3.17.3.3.4).

The Nevada Rural Housing Authority's development plan acknowledges potential demand from Project operations workers (Vogt Santer Insights 2011). As demand increases over the construction phase and in the early stages of Project operations, it is likely that residential contractors and developers from larger housing markets would respond. However, absent EML intervention, such response is likely to occur over an extended period of time. In the interim, a shortage of conventional housing in southern Eureka County would be likely. As noted, possible implications of a housing shortage include a higher level of daily and weekly commuting from communities outside southern Eureka County, full occupancy of southern Eureka County temporary accommodations (motels, RV parks and rental mobile homes) during the work week, higher level of single status employees during the work week, and escalating housing costs, which could create hardships on renters with fixed incomes.

The decrease in housing demand over a 20-year period during the reduction in mining activities and eventual closure could place a large number of housing units on the market, potentially depressing housing values in the area. Retiring Project workers who remain in their homes and

successful community economic development strategies could reduce the number of houses coming on the market during this period.

In summary, accommodation of the Project would require construction of substantial temporary and conventional housing resources in southern Eureka County. This effort would provide a substantial additional economic infusion for the community and ultimately increase property tax revenues. The volume of residential construction required in a relatively short period of time would affect County government resources, which has recently accommodated approximately ten homes and mobile home placements per year in the southern part of the County.

Effects of Higher Levels of Workforce Commuting

As discussed in Section 3.17.3.1, a shortage of housing in southern Eureka County during Project construction and the initial months of Project operations would result in higher levels of commuting from other communities than was anticipated in the 2008 Socioeconomic Assessment.

As shown in Section 3.17.2.2.2, Tables 3.17-5 and 3.17-6, there are substantial temporary housing resources in some communities outside of southern Eureka County, particularly Carlin, Elko, and Ely. There is also a substantially larger conventional housing base in these communities, which could provide housing opportunities for Project operations employees, depending on economic activities and housing availability at the time that Project operations workers are seeking housing. The numbers of Project construction and operations workers that chose to relocate to these communities rather than to southern Eureka County would depend on housing availability in southern Eureka County and individual worker and family preferences.

- **Impact 3.17.3.3-3**: The Proposed Action would result in substantial demand for housing in southern Eureka County. Absent a housing plan and development program, adequate housing is unlikely to be available during Project construction and the early years of Project operations. A housing shortage would likely result in additional daily and weekly commuting during construction and early Project operations and could inflate housing costs and rents, adversely affecting renters with fixed incomes. The substantial investment and associated economic opportunities generated in response to housing demand would be seen as beneficial by some in the community as would the expansion of the housing stock. Landlords would likely view increased housing costs as beneficial, renters and prospective buyers would view increased costs as adverse.

  Significance of the Impact: This impact is considered significant and has both beneficial and potentially adverse aspects. Nevertheless, it is suggested that EML and Eureka County build on previous and current planning efforts to develop housing resources to accommodate the needs of the construction and operations-related population. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.3.4 Public Utilities and Services Effects

Although most County functions would experience increased demand for services during construction, demand is likely to be focused on certain key services including law

enforcement/criminal justice, emergency response (first responder medical, transport and fire suppression) and the medical clinic (Freudenburg and Jones 1991; Halstead et al. 1984) in part because **TCW**s would have less demand for general government services. This demand would be related to the large Project-related increases in population, vehicular traffic and commercial and industrial activity. The public works department would also experience increased activity as it oversees construction of the street and utility infrastructure associated with new housing and commercial development.

All Eureka County infrastructure and service systems would experience increasing demand as the more long-term Project operations workforce increased during the later months of construction and the early period of Project operations, stabilizing as the full operations were achieved. Infrastructure and housing development would likely begin during Project construction and continue into the initial years of Project operations. Once substantial housing and infrastructure development is in place, Project-related demand for Eureka County facilities and services would evolve from a community expansion/construction mode to that of a relatively steady state population-related demand.

In 2008 Eureka County commissioned preparation of a fiscal analysis of the Mount Hope Project, titled *Fiscal Impact Review and Analysis of the Mount Hope Project: Understanding the Population Impacts and Costs to Provide Support Services and Facilities for the Mining Related Population* (Research and Consulting Services, Inc. 2008). The findings of this report are discussed in Section 3.17.3.2.5, Public Fiscal Effects.

Utilities

The population associated with the Project would create substantial incremental demand on community infrastructure in the Town of Eureka and in the Devil's Gate GID. Current plans would be to house a majority of the workforce in TCW housing in the Eureka Canyon Subdivision, which would be served by municipal water and wastewater systems. It is anticipated that a majority of the conventional housing needed to accommodate the Project operations-related population would also be located in the Eureka Canyon Subdivision, although some housing may be developed in the Prospect Subdivision, on infill lots in the Town of Eureka and in the two Ruby Hill subdivisions.

The Eureka County Public Works Department oversees water, wastewater, solid waste and street and road functions throughout the County. The Eureka County Public Works Department would see a substantial increase in workload to deal with the development permitting process and with overseeing the construction of water, wastewater, street, storm drainage and other improvements necessary to accommodate the housing development needed for the Project. New commercial development would also require staff time and resources. Once substantial housing and infrastructure development is in place, the incremental Eureka County Public Works Department demand would be associated with ongoing maintenance and operations of expanded water and wastewater systems and new streets, as well as the effects of higher demand on existing streets and other infrastructure. The 2008 fiscal analysis prepared for the County projected the Public Works Department would require additional staff and incur infrastructure expansion and improvement costs to accommodate the Project-related demand for services (Research and Consulting Services 2008). Project-related utility system improvements are discussed under the following system discussions.

Water Supply, Treatment, Storage and Distribution

Information for this section was obtained from the Overview of the Summary Report of Existing Municipal Water Conditions in Southern Eureka County (Damele 2010).

In the fall of 2010, Eureka County extended water lines from Ridgetop Road and Hogpen Canyon to the western boundary of the Eureka Canyon Subdivision, which is adjacent to U.S. 50 ROW. In 2011, the County secured permits from the NDOT to extend the water line under the highway and supply water service to the site prior to housing construction (Johnson 2010). Water mains underlying the main street were also replaced during 2010.

Current water use and well production capacity data indicate that the Town of Eureka's municipal water system has adequate water supply to accommodate residential development on the additional 409 lots that potentially could be developed in town, assuming per capita water consumption would be comparable to current users. As discussed in the subsection on Water Supply, Treatment, Storage, and Distribution in Section 3.17.2.2.5, Eureka County is concerned that the ground water levels in the system's two wells are declining and considers the effects of additional users and potential pumping on the system in Kobeh Valley to be uncertain (Personal Communication, Ron Damele, Eureka County Public Works 2011). The County is concerned that the County's current sources may be unable to provide an adequate water supply to meet new demands on the system from growth, resulting in a continued decline in water levels. To accommodate population growth, the County believes that it would be prudent to accelerate development of Town-owned springs and drill a third well, although it is uncertain whether water quality in the new well would be able to meet Safe **DWSs** for **As** concentrations.

Little growth in demand for water service is anticipated in Devil's Gate GID #1 due to the limited size of the district.

Currently the 60-gpm well that serves as the primary source for Devil's Gate GID #2 cannot accommodate the potential build out of an additional 234 lots. The district has an additional 200 gpm well but the water from that well requires treatment to meet Safe **DWS**. Eureka County completed an additional 400,000 gallon storage tank and associated water transmission line during 2010 and early 2011 (Personal Communication, Ron Damele, Eureka County Public Works 2011).

Eureka County may be required to develop a new water source to ensure availability of adequate water for the Town of Eureka, given falling water levels in Diamond Valley where the town's wells are located. Improvement of the water quality in an existing well in GID #2 would also be needed.

Wastewater Collection and Treatment

Construction and operation of the Proposed Action would generate demand for additional wastewater collection and treatment services exceeding the capacity of the existing system. To accommodate that demand, capacity of the Town of Eureka's wastewater treatment facility would need to be expanded to 200,000 gpd and the wastewater outfall enlarged, at an estimated total cost of $1.6 million for both improvements. A majority of the collector main system within the town has recently been replaced but service would need to be extended to some areas to accommodate new growth.

Solid Waste Disposal

Solid waste generated by growth associated with the Project, including waste generated during construction of new housing, would shorten the remaining life of the Class II-rated (less than 20 tpd) Whiskey Flat Landfill; however, the landfill capacity should be adequate through the Project's construction and initial operations periods. Assuming rates of solid waste generation similar to the current community, the Project would decrease the expected 30-year life of the existing landfill to between ten and 20 years, accelerating the need for efforts to obtain the necessary permits for an expansion **by obtaining control of existing mining claims** or **to** secure a new location. Additional operating staff or equipment may be necessary to accommodate the increased volumes of solid waste.

EML plans to develop an on-site Class III-waivered solid waste disposal facility for non-hazardous, non-liquid, mine site industrial wastes; therefore, demands on the county landfill would be limited to population-related waste and Project wastes that could not be disposed in the Class III-waivered landfill and that meet the disposal requirements of the Class II-rated landfill.

Administrative Services

The Project would increase demand for County administrative services including those provided by the Board of County Commissioners, and the offices of the Assessor, Clerk and Treasurer, and Recorder/Auditor. Although the population would increase substantially, the increases are unlikely to proportionally increase staff and equipment; however, there may be unique needs associated with the Project that require a higher level of staffing than currently exists. For example, the addition of new homes and businesses to the tax roll, along with the increase in the number of motor vehicle titles and licenses processed for the Nevada Department of Motor Vehicles (DMV) by the Assessor's office would likely require additional staff and office space. The Assessor recognizes the DMV service as being vital to the community and, along with the Board of County Commissioners, would strive to ensure that the service remained available (BCLLC/SDLLC 2008). Other administrative offices may also need to increase staffing to accommodate incremental growth in the County. In its 2008 Fiscal Assessment, Eureka County indicated that the Assessor, Clerk/Treasurer and Auditor's offices would each require additional staff, along with modest additional outlays for equipment to accommodate Project-related population growth (Research and Consulting Services 2008).

Eureka County Department of Natural Resources

Implementation of the Proposed Action could result in increased demand for Department of Natural Resources water use monitoring, rangeland and vegetation monitoring, weed control and liaison between the Board of County Commissioners and EML. The Department's current water monitoring program could also require expansion.

Law Enforcement and Criminal Justice

Sheriff's Office

In addition to a general need for law enforcement services associated with population growth, workforce commuting and material, equipment and supply transport to the Project Area would increase demand for traffic control, enforcement and accident response in the southern portion of

the County and north along SR 278 to I-80. The influx of **TCW**s would result in increased demand for law enforcement and criminal justice services.

The level of increase in crime associated with the construction phase of the Project would be dependent in part on the communication and coordination between EML, the engineering, procurement and construction management (EPCM) contractor, and the Eureka County Sheriff's Office and District Attorney. **Communication between EML and Eureka County to provide Project updates is outlined in Section 2.1.14.1.** If the EPCM contractor establishes clear expectations about employee conduct in the community and follows up with appropriate personnel procedures for employees that violate those guidelines, the potential for increases in crime and disruption could be reduced (BCLLC/SDLLC 2008).

After operations begin and the workforce stabilizes, law enforcement and criminal justice demands would likely be similar to current demand with increases related to the general increase in population. The increased traffic on SR 278 would require increased traffic enforcement and accident response over the long term. Project-related demand during both construction and operations would include the need for additional officer's equipment and administrative staff. Project-related needs for the Sheriff's Office outlined in the Eureka County's 2008 fiscal analysis included additional staff, equipment and expansion and improvement of administrative and jail facilities (Research and Consulting Services 2008).

District Attorney

The Eureka County District Attorney's office would experience an increase in prosecutions as a result of the population increase associated with the Project. In general, the experience with other larger-scale construction projects throughout the west over the past 20 to 30 years is that there is likely to be an increase in prosecutions (BCLLC/SDLLC 2008). Given the housing, infrastructure and commercial development that would be occurring in the County during the Project, it is likely that an increase in administrative duties would also be required. Eureka County's fiscal analysis estimated need for additional legal and administrative staff and equipment in the District Attorney's office to accommodate Project-related growth (Research and Consulting Services 2008).

Eureka Justice Court

The Eureka Justice Court could potentially experience increases in small claims, civil cases, traffic offenses, and preliminary disposition of felonies associated with the Project-related population growth. These increases would likely require the addition of either a full time or on-call administrative staff and related equipment, which is consistent with Eureka County's 2008 fiscal assessment (Research and Consulting Services 2008).

Eureka County Juvenile Probation Office

The SA yielded a range of 25 to 80 additional high school/middle school aged youth in southern Eureka County once the Project is operational. The increased youth population could potentially result in increase in demand for Juvenile Probation services. The probation office could require additional staff and would incur additional costs to provide services to Project-related target youth and to provide athletic services to all Project-related youth, which is consistent with Eureka County's fiscal assessment (Research and Consulting Services 2008).

Emergency Response

Calls for emergency response, including emergency medical, transport and fire suppression, would increase due to population growth and increases in the number of traffic accidents associated with industrial construction and mining activity. Response time to the Mount Hope area, where the mine would be located, is 45 minutes including the time required to assemble volunteers.

EML would provide fire suppression and emergency response resources at the Project Area. These resources would be in compliance with MSHA and insurance carrier requirements and would be based on the experience of EML's management team. EML would provide contingency planning for the Project and would not rely on the Diamond Valley or Eureka fire suppression or emergency response teams to provide primary response to the mine site (BCLLC/SDLLC 2008).

Fire Protection

The Eureka VFS and the Diamond Valley VFS are staffed by volunteers. Recruiting volunteers to meet the increased demand may be a challenge during the construction phase of the Project. Equipment costs for each new volunteer is approximately $1,800 and training costs are approximately $1,000 (Personal Communication, Mike Sullivan, Eureka County **EMS** 2006).

As the closest fire station to the Project Area, the Diamond Valley VFS may be called to respond to fire incidents and accidents at the mine site, although EML would have primary fire suppression and accident response personnel and equipment on site. Identified needs to serve the envisioned increases in traffic and industrial activity in the southern part of the county, including that associated with the Project, include a heavy rescue truck and related equipment. Estimated costs for the truck and equipment range between $200,000 and $400,000 (BCLLC/SDLLC 2008; Massey 2010).

Emergency Medical/Ambulance Services

The Eureka County EMS is staffed largely by volunteers. Although mine operations workers **may** join these volunteer agencies, few construction workers are likely to do so; consequently, EMS services may be **especially** strained during the construction phase of the Project. On the other hand, EML or the EPCM contractor would have EMT personnel and equipment on site during construction **and operations as outlined in Section 2.1.10**, which may reduce the number of calls to the construction site. Eureka County's 2008 Fiscal Assessment estimated that the EMS Department would need additional staff and equipment to accommodate the Project-related increase in population (Research and Consulting Services 2008).

An older-model ambulance stationed at the Diamond Valley fire station would likely need to be replaced sooner if the Project is implemented in order to maintain adequate service for the increased population, traffic, and industrial activity associated with the Project. In addition, the EMS would incur training and equipment costs for each new volunteer.

Health Care

Both the direct and secondary workforce associated with Project construction could use the Eureka Medical Clinic. Construction workers are likely to use the clinic for minor emergencies

and urgent care, preferring to seek service in their home communities for elective and routine care. Relocating operations and secondary workers are more likely to have families present and use the medical clinic for routine care. EML may contract with the clinic or Nevada Health Centers, Inc. for industrial medicine needs including physicals and drug testing.

The Eureka Medical Clinic currently has one physician and one physician's assistant. The rural health care standard is one physician per 1,500 people (BCLLC/SDLLC 2008) and there were approximately 1,350 people in southern Eureka County at the time of the 2010 Census. During the initial years of production, the Project would result in incremental population growth of approximately 600. Although the additional population would increase demand for health care services, the incremental growth **may** warrant **the** addition of another full-time physician at the clinic, **and** may require an increase in support staff. Fees for service would at least partially offset the cost of additional staff because Project operations employees would have health insurance. The Project would generate revenue for indigent health care, although the receipt of such revenue may lag demand during the early months of construction.

Given the difficulty in attracting and retaining health care providers in rural areas, there may be periods in which the Eureka Medical Clinic is without long-term medical staff, including a physician or physician's assistant. During these periods, Nevada Health Centers, Inc. would attempt to staff the Eureka Clinic with temporary medical professionals or cover the clinic with staff from other clinics in its network, although there would be additional costs associated with temporary staffing. The Eureka Clinic has less difficulty than some rural clinics in recruiting medical professionals because of the compensation level, the relatively low patient load, and the attractiveness of the community. Although the 24/7 nature of the on-call requirement can be a detriment for some medical professionals and contribute to burn-out, the compensation package is based on this requirement, which helps attract and retain medical staff (Personal Communication, Carl Heard, Nevada Health Centers Inc. 2008).

If Nevada Health Centers, Inc. were unable to cover the clinic with either long-term or temporary staff, EML employees and their households as well as other southern Eureka County residents would be without local medical care, and they would be required to travel to clinics and physicians in more distant communities for health care.

Social and Senior Services

The availability of a large number of construction jobs would attract job seekers to southern Eureka County, some of whom may arrive with few resources. It is anticipated that the Eureka County Social Services Coordinator would see an increase in indigent individuals and families seeking assistance during the construction phase of the Project, some of whom may not have the resources to travel to Ely to apply for help from the Nevada Department of Human Resources. Eureka County may incur additional emergency aid costs during the construction period.

Given the relatively high wages anticipated for Project operations workers and the fact that operations workers would have health insurance, the operations workers are not anticipated to substantially increase the caseload of the Eureka County Social Services Coordinator.

During the operations phase, some relocating workers may be accompanied by older household members, but these working age households are unlikely to contain a large number of seniors.

The substantial Project-related housing demand would likely increase area housing costs, which could affect seniors who are renting housing in the Town of Eureka.

Additional part-time or temporary Social Services staff may be needed during construction. A need for additional emergency assistance funding would also be likely. These demands would likely diminish soon after Project operations begins.

Library and Recreational Facilities

Library and community recreation facilities in the Town of Eureka would experience a substantial increase in demand as a result of the Proposed Action. The two ballparks and the swimming pool would likely to see an increase in use and events held at the County fairgrounds such as horse shows, rodeos, the County fair, bicycle races and softball, archery and shooting tournaments are likely to see increases in participants and spectators associated with the mine population. These increases may result in the need for expansion of recreation facilities, particularly ballparks and possibly the spectator facilities at the fairgrounds.

Public Utilities and Services Sensitivity Analysis

As shown in Table 3.17-23, the operations-related population during the first nine years of production operations would be approximately 32 percent or 190 persons higher under SA 3 than under the 2008 Socioeconomic Assessment or Base Case. The higher incremental population associated with SA 3 would translate into slightly higher demands on public facilities and services during the period of initial response to Project construction and operations.

Public Education

The 2008 Socioeconomic Assessment projected an increase of 17 students for the ECSD by the end of the first year of Project construction and 68 new students by the end of the second year of construction and initial operations. During the initial years of Project operations (up to ten years) it is estimated that there would be 96 new students under the Base Case, which would be approximately 37 percent of 2009/2010 fall enrollment.

Again, based on the assumptions in the 2008 Socioeconomic Assessment, the incremental ECSD enrollment during initial Project operations would include an estimated 67 elementary school students and 29 middle/senior high school students. When added to fall 2009-2010 enrollment (135), the Project initial operations-related elementary school enrollment of 67 students would increase total enrollment at the elementary school to 202 students. This would be below the elementary school's maximum capacity of 280 and optimum capacity of 240.

The 29 middle/senior high school students anticipated during full operations, when added to fall 2009-2010 enrollment (125), would total 154 students. This would be below the school's maximum capacity of 232 and optimum capacity of 190.

Based on the enrollment projections above, the ECSD could need to hire as many as three to four additional teachers for the second year of construction and one or two more teachers to accommodate the students associated with initial operations. These numbers could be increased or reduced depending on the actual distribution of Project-related enrollment and the needs of incoming students. Additional support and administrative staff could also be required during

each of these periods. The ECSD would also see increases in other instructional costs, administrative costs, and transportation costs to accommodate this level of students without compromising the current level of educational services.

School Enrollment Sensitivity Analysis

The 2009 SA examined the effects of different assumptions about the Project-related resident population, labor force participation and school age children per household factors than were used in the 2008 Socioeconomic Assessment. SA 3, which provides the upper bound of population effects for the SA, contained an estimated increase in enrollment from 140 to 160 students, contrasted with 96 for the Base Case. Based on the assumptions used for SA 3, the incremental ECSD enrollment would be a maximum of 98 elementary school students and 80 middle/senior high school students. When added to Fall 2009-2010 enrollment (135), the initial operations-related elementary school maximum enrollment of 98 students under SA 3 would increase total enrollment at the elementary school to 233 students. This would be below the elementary school's maximum capacity of 280 and optimum capacity of 240. The maximum of 80 middle/senior high school students anticipated during the first nine years of full operations when added to Fall 2009-2010 enrollment (125) would total 205 students. This would be below the school's maximum capacity of 232 and 15 students above the optimum capacity of 190.

Under the enrollment estimates associated with SA 3, the ECSD would likely be required to hire additional instructional staff as compared to the Base Case and would also see higher levels of other instructional costs, administrative costs and transportation costs to accommodate the higher enrollment associated with SA 3.

Effects of Higher Levels of Workforce Commuting

As discussed in Section 3.17.3.1, a shortage of housing in southern Eureka County during Project construction and the initial months of Project operations would result in higher levels of commuting from other communities than was anticipated in the 2008 Socioeconomic Assessment. Higher levels of workforce commuting would result in a lower Project-related population in southern Eureka County and a correspondingly lower demand for public infrastructure and services. Conversely, the workers who relocated to communities outside of southern Eureka County and commuted to the Project would generate demand for public infrastructure and services in those communities. The commuting construction workforce would reside in temporary housing and generate demand for a limited range of public services, primarily law enforcement, emergency response and medical services (temporary housing is assumed to be already served by public infrastructure such as water, wastewater and solid waste collection). Non-local commuting operations workers would generate incremental demand for the full range of public infrastructure and services in their respective communities. Additional law enforcement and emergency response services could also be generated along transportation routes**, specifically along SR 278,** from host communities to the Project for both construction and operations workers.

Non-local commuting Project workers are likely to be dispersed among several communities and their numbers would likely be small in comparison to the population of the most likely host communities (Carlin, Elko, and Ely), therefore effects on public facilities and services would likely be minimal.

- **Impact 3.17.3.3-4**: The Proposed Action would result in a substantial demand for public infrastructure and services in southern Eureka County. Expansion and improvement of public infrastructure and services could in some cases provide a higher level of services for current residents and the associated expansion of infrastructure could support the County's long-term community and economic development plans. Conversely the substantial expansion of County services and infrastructure to support Project-related demand would be required over a relatively short period of time and likely strain the resources of County government.

  Significance of the Impact: This impact is considered significant and has both beneficial and potentially adverse aspects. Nevertheless, it is suggested that EML and Eureka County build on previous and current planning efforts to address public infrastructure and service issues. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.3.5 Public Fiscal Effects

Project-Related Revenues

The estimates contained in this section are based on Project investment and production estimates provided by EML. The estimates are subject to change as the Project proceeds and as materials, equipment and supply costs change and commodity prices fluctuate. However, the following assessment provides a reasonable assessment of the tax revenues that would flow from the Project, based on the foregoing inputs.

Increases in local sales tax receipts would begin accruing immediately in response to consumer expenditures by the construction labor force and taxable purchases of materials and supplies by the mine itself, some of which may occur in advance of construction. Such revenues would continue over the long term due to the ongoing stimulus associated with operations, processing, closure and reclamation. The sales tax increase could affect the distribution of the supplemental city-county relief tax (SCCRT), which is a statewide sales and use tax levy.

The Project's real and personal property and net proceeds from sales would be subject to taxation by the County and the ECSD, as well as the State of Nevada. The Project's taxable values in these categories would be subject to the tax at the same rates as other real property in the County. Over time, the Project would contribute substantial revenues to the county; however, there would be a delay in the accrual of substantial property and net proceeds tax revenues following the onset of development and production. The revenues generated by the Project could be used to defray some or all of the incremental costs of public services. In the event of net long-term surplus revenues generated from taxes on the proceeds of mining, such revenues could bolster the County's reserve accounts maintained to address the year-to-year fluctuations inherent in revenues associated with changing economic conditions, particularly in the mining industry (BCLLC/SDLLC 2008).

Property Taxes

Future general property taxes would primarily be a function of capital investments in plant and equipment, depreciated over time. Preliminary mine development costs initially subject to

property taxes are estimated at approximately $490 million. Taxable value would decline over time due to depreciation, but may stabilize as major mining equipment is replaced and facility upgrades occur. Property taxes would continue to be generated over the life of the Project, but have not been quantified beyond Year 10 of operations.

General property tax revenues levied on the Project, based on current tax rates and anticipated investment, are projected at just over $2.7 million for the first year of full operations, declining over time. Projected cumulative general property tax revenues projected through Year 10 of operations are $15 million. Property taxes would continue to be generated over the life of the Project, but have not been quantified.

Estimated total general property taxes of $7.4 million would accrue to Eureka County through the construction period and first ten years of production. Projected property tax revenues to the ECSD are approximately $6.6 million. The Project would be assessed for any new obligations issued to cover future facility and other major capital needs of the ECSD.

New residential and commercial development built to accommodate growth and the effects of growth in raising the market values of existing development would also contribute to the tax base. Any such development located within the Town of Eureka would be subject to additional tax to fund services provided in the town. Projections of such revenues could not be quantified due to uncertainties regarding the value, timing, and location of such development and the indirect impacts on existing property values.

Taxable real and personal property in Eureka County is also subject to a statewide levy of $0.17 and $0.0085 for the countywide TV District. Tax revenues derived for those purposes from the Project itself are estimated at $1.5 million and $75,000, respectively, through the construction period and ten years of operations and continue accruing over the life of the Project.

Net Proceeds Taxes

Current reserve estimates for the Project support anticipated production of 1.1 billion pounds of recoverable Mo. Ad valorem taxes would be levied on the net proceeds of mining, which are in turn, a function of production, the costs of recovery and processing, market prices, and a variable tax rate of between two and five percent based upon the ratio of gross to net proceeds. A portion of any net proceeds taxes would be distributed to the County and ECSD. The remaining taxes would accrue to the state.

During the first ten years of operations, the period during which local facility infrastructure needs and staff expansion would most likely occur, EML has projected total net proceeds of $186.4 million: $30.6 million to Eureka County, $31.6 million to the ECSD, and approximately $124.2 million to the State of Nevada. Projected net proceeds of mining taxes over the life of the Project total nearly $384 million: $64.9 million to Eureka County; $62 million to the ECSD; $652,000 to the TV District; and, $256 million to the State of Nevada (BCLLC/SDLLC 2008). Even if prices decline or fluctuate over time, substantial taxable net proceeds would be expected in conjunction with long-term operations.

Past experience for the mining industry in Nevada indicates that the net proceeds for individual mines can vary considerably year-to-year and over time, posing challenges for local government preparing their annual budgets. However, experience also indicates that the major mines pay

substantial net proceeds taxes over the life of the mine. Such taxes have historically been a substantial source of revenue for Eureka County and the ECSD, supporting current operations as well as contributing to reserve funds that both the County and the ECSD have accumulated over time. These reserves provide an important budgetary buffer that could be used to temper year-to-year variations in net proceeds revenues.

Sales and Use Taxes

Construction and operations of the Project would generate substantial sales and use tax receipts. Purchases of equipment, supplies, and construction materials by the Project would be subject to such taxes, along with consumer purchases by the contractor laborers and Project workforce, as well as such purchases by the secondary businesses and workers supported by the Project.

The present sales tax rate in Eureka County is 6.5 percent: 2.25 percent for local school support tax (LSST), 0.50 percent for basic city-county relief tax (BCCRT), 1.75 percent for SCCRT, and two percent for state sales tax. Revenues generated by BCCRT and SCCRT are generally distributed to the jurisdictions in which the sale occurs. Revenues derived from LSST generated by local sales accrue to the ECSD, while revenues from purchases levied on out-of-state purchases accrue to the State Distributive School Account to support statewide education funding. Use taxes are levied on purchases of commodities from out of state retailers intended for use and consumption in Nevada, with the accrual of tax revenues based on the location of the delivery or use.

Detailed estimates of the taxable purchases by the mine and workforce during construction could not be quantified; however, a series of preliminary projections were developed for the 2008 Socioeconomic Assessment based on a series of assumptions.

Total sales and use tax revenues during construction **and through year 10 of operations are projected at $63.9 million. The total includes** $22.1 million in LSST, $4.9 million in BCCRT, $17.2 million in SCCRT, and $19.7 million in state sales tax. **Of the total,** Eureka County is projected to realize $22.1 million in **BCCRT and SCCRT, and an** estimated $11.1 million in LSST revenue **(50 percent of the total)** would accrue to the ECSD**. The State of Nevada would realize $30.7 million in LSST and state sales and use tax revenue**. Some of these revenues would benefit other local governments and school districts via intergovernmental transfers, such as the statewide education funding. The Project would generate sales and use taxes over the life of the Project with the amounts fluctuating over time in response to changes in the level of payrolls, the range of goods and services available locally, and the volume of purchases by the mine as the rates of mining and production vary.

Total Project-Related Revenues

Cumulative revenues generated by the major taxes during construction and through Year 10 of operations are projected at $60.2 million for Eureka County, $50.6 million for the ECSD and $113 million for the State of Nevada.

The estimated timing of revenue flows to Eureka County and ECSD Year 10 of operations show that there would be moderate revenues in Years 1 through 3 but revenues from the Project would peak in Year 4 with over $8 million in revenues each to the ECSD and Eureka County.

Tax receipts by the State of Nevada would increase from the Proposed Action; sales and use taxes and net proceeds taxes described above being the two primary sources of such revenue. Approximately 66 percent of future net proceeds of mineral taxes would accrue to the State of Nevada. The state would also garner revenues from the modified business tax on employment supported by the Project.

Project-Related Expenditures

Development and operations of the Project would require increased public expenditures on the part of Eureka County and the ECSD for increased staff, equipment and in some cases expanded and improved infrastructure and facilities. Although Project–related staffing, equipment, infrastructure and facility impacts are discussed qualitatively in Section 3.17.3.2.4, Public Utility and Infrastructure effects, the expenditures associated with those effects were not estimated for this assessment, in part because County and ECSD plans for accommodating growth were not known.

The aforementioned fiscal analysis commissioned by Eureka County (Research and Consulting Services 2008) considered the potential service and facility costs associated with the Project. The fiscal study noted that the residential and commercial growth associated with the Project could not be accommodated without improvement and expansion of some systems but recognized that a portion of the capital improvements identified in the study would serve to correct existing deficiencies and to support Eureka's broader economic and community development plans. The County's study acknowledged that user fees and negotiated development fees/exactions/system improvement fees, including those associated with Project-related development could finance a substantial portion of the costs, but concluded that temporary shortfalls were possible.

The County's fiscal assessment suggested that the County's staffing could expand by as much as 25 percent at a cost of over $2 million annually and one-time initial capital improvements would be required with an estimated cost of $7.2 million, approximately 45 percent of which would be funded by utility users (Research and Consulting Services 2008). The anticipated capital improvements included the following:

- An expansion of the jail and administrative facilities for the Sheriff's department;
- Future expansion of the landfill;
- Purchases of new emergency and maintenance vehicles and other major equipment; and
- Water and wastewater system improvements.

Since the fiscal study was completed, the County has completed a number of improvements identified in the study to correct existing deficiencies, to prepare for growth and to extend service to the Eureka Canyon Subdivision as part of the housing initiative with the Nevada Rural Housing Authority to serve existing non-Project housing needs in the community.

There are some differences of opinion regarding the Project's effects on some facilities and staffing levels, such as the jail, which are noted in the 2009 supplemental information submitted to the BLM (BCLLC/SDLLC 2009; Appendix **E**). The memorandum further suggested that expansion of the landfill would not be required for several decades and suggested that Project generated revenues and user fees would be available to fund some or all of the costs of

infrastructure and services. For example, a total of $3.25 million of the utility expansion and improvement costs would be associated with user-funded water and wastewater systems.

Based on the investment estimates provided by EML, Eureka County would receive almost $9 million in Project-related revenue during the first two years of construction. These revenues could be used to offset the costs of additional staff, equipment and infrastructure improvements needed to accommodate the Project. However, the County would be required to fund some utility infrastructure improvements, purchase equipment and hire staff prior to the initiation of construction in order to accommodate the Project-related growth and development. If the Project is approved and the County expended funds in anticipation of Project-related growth and the Project subsequently did not proceed, was delayed, or was prematurely terminated, the County would not receive revenues or perhaps not receive adequate revenues to cover the cost of these improvements and could be required to lay off staff and maintain oversized facilities.

The County study focused on the costs of development and did not contrast these cost with the availability of revenues from the aforementioned fees or with tax revenues that have been estimated for this assessment. Based on the production-related revenues forecast in the preceding sections, annual revenues from operations would be adequate to cover the County's projected ongoing Project-related staffing costs outlined in the County's Fiscal Assessment, and, in years of high net proceeds revenues, could contribute funding for capital improvement or special projects or to the County's reserve accounts.

Regarding ECSD expenditures, Project-related school enrollment increases during initial production operations would require additional instructional and support staff, additional instructional materials and perhaps some facility configuration and additional maintenance costs. There would be a delay between the time that Project-related enrollment began to increase and when the ECSD would receive Project-related ad valorem tax revenues; however, the ECSD would receive proceeds from the LSST early in the construction phase.

As noted above, based on the investment estimates provided by EML, Eureka County would receive almost $9 million in Project-related revenue during the first two years of construction, and the ECSD would receive approximately $4.5 million; these entities could use this revenue to offset the cost of staff and equipment needed to accommodate Project-related demand.

- **Impact 3.17.3.3-5**: The Proposed Action would result in substantial short- and long-term increases in tax revenues as well as expenditures for Eureka County and ECSD.

  Significance of the Impact: This impact is considered significant. While the long-term tax revenues would likely provide for increased infrastructure expenditures, it is suggested that EML and Eureka County build on previous and current planning efforts in order to prepare for the possible timing differences between expenditures and tax revenues. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

Effects of Higher Levels of Workforce Commuting

As discussed in Section 3.17.3.1, a shortage of housing in southern Eureka County during Project construction and the initial months of Project operations would result in higher levels of

commuting from other communities than was anticipated in the 2008 Socioeconomic Assessment. Communities located outside of Eureka County would receive no direct revenues from the Project although they would receive a distribution of the certain state revenues generated by the Project. Project workers would generate sales taxes in their host communities. Project operations workers would generate utility fees and those workers who purchased homes would generate property taxes. It is not known whether these amounts would be adequate to offset the costs of Project worker public infrastructure and service demand, but this demand should be relatively minimal.

3.17.3.3.6 Effects on Social Conditions and Affected Publics

Although there are no significance criteria for effects on social conditions and affected publics, Appendix D (Social Science Considerations in Land Use Planning Decisions) of the BLM Land Use Planning Handbook H-160-1 lists social organization and condition social groups and networks, occupational and interest groups and the significance of proposed land management actions for various publics as topics for socioeconomic analysis and, for the latter topic, suggest that such information can provide information to help identify impacts and mitigation strategies (BLM 2005).

As noted in Section 3.17.2.2.6, the population in southern Eureka County would be affected by the development and operations of the Project, either directly or indirectly. Many individuals would benefit from the job opportunities and most local businesses would benefit from the increased economic activity and spending by EML and consumers, although some business owners may also experience loss of employees and difficulty in recruiting new employees during the early years of Project operations. County residents would also benefit indirectly from the increased tax revenues, which, during Project operations, could allow for either an increase in the level of County services or a reduction in the overall property tax rate or some combination thereof, depending on the performance of other sectors of the tax base. The increased economic activity is also likely to increase the number and diversity of shopping, dining and recreation businesses within the community.

The influx of newcomers, both temporary and long term, is likely to enhance the vitality of the community and create enthusiasm and opportunity for many residents. However, the magnitude and pace of growth may have adverse social effects for some individuals and groups. The occurrence and severity of potentially adverse effects would depend in part on the effectiveness of the impact avoidance, management and coordination strategies developed by EML and Eureka County.

Eureka County has a long history of mining although most of the recent mining has occurred in the northern part of the County. However, southern Eureka County residents are familiar with mining projects and some are either employed by mining companies or have family members or acquaintances employed in the mining industry. The Barrick Ruby Hill Mine, which currently has over 120 employees, is immediately adjacent to the Town of Eureka. Given this history of and familiarity with mining, the social effects of the Project would likely result **primarily** from the introduction of a large number of newcomers into a small, relatively stable rural community, **although** the fact that the Project involves mining **may also play a role**.

Under the inputs and assumptions used for this assessment, the Project (including construction worker housing facilities) would increase the population of southern Eureka County by

approximately 50 percent on average and 67 percent during the short-term construction peak, as compared to the 2010 Census population. Population increases during the first nine years of production would be approximately 45 percent of 2010 Census population. Given such growth, social change would be rapid and substantial during Project construction and the first several years of Project operations. Although the Town of Eureka is geographically remote from other major communities, residents are accustomed to influxes of construction workers, miners, tourists and travelers, the latter two particularly in summer months, but the sustained high numbers of newcomers in social settings including the post office, stores, restaurants, bars and recreation facilities and the pace and magnitude of residential development would likely be disconcerting for some, particularly those that value the current rural, small town character of the community.

During construction, large numbers of Project-related workers residing in southern Eureka County are likely to shop, dine, and recreate in the Town of Eureka. Many businesses and residents would likely welcome the economic benefits associated with this infusion. However, given the limited scale of the existing commercial and service base in the town, the potential exists for dissatisfaction among some current residents if increased patronage of cafes, restaurants, bars, casinos, stores, and other social and recreation settings results in crowding and congestion. Dissatisfaction could also arise as a result of growth-related increases in traffic, crime, and alcohol or drug-related social problems.

These effects could be reduced by the organization of recreational activities (e.g., softball and basketball teams), by developing policies to minimize disruptive behavior in bars and other recreational settings and by close coordination between EML, contractors, and Eureka County law enforcement officials. Conflict between Project workers and residents cannot be entirely avoided and some residents are likely to be dissatisfied with the change in the social setting.

Although many residents would benefit from the increased opportunity and economic activity associated with the Project, some are likely to suffer economic hardship, particularly those on fixed incomes. Increased housing demand would exert upward pressure on housing costs and people with fixed incomes that rent may see their housing costs increase. Increased demand may also exert upward pressure on other prices, although over time the larger population may attract competition and in fact may lower costs for some commodities such as groceries and gasoline.

A telephone survey of Eureka County residents was conducted in April 2010 to gauge residents' opinion on the Project. A total of 680 telephone numbers were called, which represents nearly all households in the greater Eureka, Crescent Valley, and Diamond Valley areas, and 219 responses to the survey were received. Of the 219 responses, 51 percent lived in Eureka, 24 percent lived in Crescent Valley, 20 percent lived in Diamond Valley, three percent lived in Beowawe, and two percent lived in Pine Valley. Nearly three-quarters of the area residents (74 percent) were supportive of the Project development, including 33 percent who were "very" supportive. Fifteen percent of the residents were opposed and 11 percent did not know or declined to respond. Of the 15 percent who opposed to Project, approximately half cited competition for water/bad for farms as their reason, while 21 percent mentioned population growth and 18 percent mentioned water pollution. Among the 74 percent who support the Project, the most important factor (42 percent) was the addition of new, high-paying jobs to the area, followed by increased revenues for local businesses (27 percent), providing minerals and

metals our country needs (12 percent), and more tax revenues for local government (11 percent) (McDowell Group 2010).

Agricultural operators in Diamond Valley are concerned about the Project's effect on the valley's ground water. It would be difficult to overstate the importance of water to these growers. Their concerns may be diminished somewhat with implementation of the monitoring program described in Section 2.1.16 of this EIS and by the mitigation measures described in Section 3.2; however, it is likely that some Diamond Valley agricultural operators would continue to be dissatisfied with implementation of the Proposed Action regardless of monitoring and mitigation measures. Diamond Valley agricultural operators may also experience difficulty in attracting and retaining labor during Project construction.

Section 3.12.3.3 of this EIS describes the loss of AUMs in affected grazing allotments and the potential effects on water sources in the ten-foot drawdown contour and the measures to mitigate these effects. **Mitigation for these potential impacts is discussed in Section 3.26.**

Section 3.15 of this EIS describes current recreation use of lands within and adjacent to the Project Area and potential Project-related impacts to recreation resources and use. Recreation users would be precluded from using lands within the Project Area for safety and security reasons; however, these lands are not unique, and withdrawal of these lands from recreation use would represent a relatively small reduction in lands available for recreation in southern Eureka County.

Recreation users of lands adjacent to and within sight and hearing distance of the Project would experience a change in the recreation setting. Given the vast area of public lands available for dispersed recreation use in Eureka County, recreation users who are disturbed by the visual/noise intrusion and industrial activity are likely to relocate while the mine is in operation. Consequently, no major change in outdoor recreation visitation or visitor spending would be anticipated with the opening of the mine. **Impacts related to recreational use on Roberts Creek are discussed in Section 3.15.3.3.5 and mitigation is outlined in Section 3.2.3.**

Some visitors, re-enactors and supporters of the Pony Express National Historic Trail, which traverses the Project Area, would likely be concerned about the change in the setting near the Project Area.

In summary, potential changes in social conditions associated with the Project would be perceived as positive by some Eureka County residents and adverse by others. Many residents likely have mixed feelings about the mine, welcoming the economic and fiscal effects and the prospect of eventual expansion and diversification of the commercial sector in the community, but with concern for the change in the stable, close-knit community. These attitudes and concerns have the potential to change or harden depending on how well the socioeconomic effects of the Project are managed and the mine's ultimate effect on ground water in the Diamond Valley, which is described in Section 3.2.3.3 of this EIS. No significance criteria have been established for overall social change, but continued coordination between EML and Eureka County and the groundwater monitoring and mitigation measures identified in this EIS hold the most promise for enhancing the beneficial effects and tempering the adverse effects of social change associated with the Project.

Effects of Higher Levels of Workforce Commuting

As discussed in Section 3.17.3.1, a shortage of housing in southern Eureka County during Project construction and the initial months of Project operations would result in higher levels of commuting from other communities than was anticipated in the 2008 Socioeconomic Assessment. All of the communities within 100 miles of the Project (with the possible exception of Austin, a historic mining community) have a substantial portion of their residents who work in the mining industry and have hosted mining construction workforces. The addition of a relatively small number of Project-related mine workers in these communities is unlikely to result in adverse social effects.

3.17.3.3.7 Residual Adverse Impacts

The Proposed Action would have the unavoidable indirect potential to adversely affect County services and facilities**, housing, population, economic conditions, and employment** in the short term through substantial growth and concentration of population.

3.17.3.4 No Action Alternative

Under the No Action Alternative, the proposed Project would not be developed and associated impacts to social and economic values would not occur; however, EML would likely continue to conduct mineral exploration and data acquisition within the Project Area. The area would remain available for future mineral development, recreational use, or for other purposes as approved by the BLM. There would be no beneficial impacts from the Project to employment, income or tax revenues, and there would be no adverse impacts to county services and facilities.

3.17.3.4.1 Residual Adverse Impacts

The No Action Alternative would have no effect on tax revenues, employment opportunities, or income.

3.17.3.5 Partial Backfill Alternative

Under the Partial Backfill Alternative, the Proposed Action would be developed as outlined previously and have the same surface disturbance footprint; however, at the end of the mining in the open pit, the open pit would be partially backfilled to eliminate the potential for a pit lake. Backfilling would commence in Year 32 and be completed in approximately 13 years (95 million tpy). The partial backfilling would be accomplished by the same fleet and personnel that performed mining, and as a result, employment would be approximately 370 workers through the end of ore processing (Year 44) and a reduced staffing from Year 44 through the completion of the partial backfilling (Year 45).

3.17.3.5.1 Economic and Employment Effects

The effects from this alternative would be similar to those of the Proposed Action. Substantial expansion would occur in selected sectors of the local economy. The employment demand and competition during construction would be the same. Project operations employment levels would be the same except that employment levels would remain at 370 employees through Year 44.

- **Impact 3.17.3.5-1**: The Partial Backfill Alternative would result in substantial economic expansion similar to the Proposed Action. Project employment levels would be somewhat higher in the later years of Project operations.

  Significance of the Impact: This impact is considered significant; however, no mitigation measures are proposed. Continued employment of an existing workforce is likely to be viewed as beneficial. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.5.2 Population Effects

Effects of this alternative would be similar to those of the Proposed Action. The population resulting from Project operations would be the same; however, 370 employees would remain employed through Year 44 whereas activities and employment under the Proposed Action would decrease at Year 32 at the end of the mine life.

- **Impact 3.17.3.5-2**: The Partial Backfill Alternative would result in substantial growth and concentration of population.

  Significance of the Impact: This impact is considered significant. This impact is likely to be viewed as beneficial as it would delay community population losses associated with mine closure. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.5.3 Housing

The effects from this alternative would be similar to those of the Proposed Action. The housing demand resulting from Project operations would be the same; however, 370 employees would remain until Year 44 and require housing for this extended period.

- **Impact 3.17.3.5-3**: The Partial Backfill Alternative would result in substantial demand for new housing.

  Significance of the Impact: This impact is considered significant. This impact is likely to be viewed as beneficial as it would delay potential adverse effects on the southern Eureka County housing market. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.5.4 Public Utilities and Services Effects

The effects from this alternative would be similar to those of the Proposed Action. The demand for public services and facilities resulting from Project operations would be the same except that 370 employees would remain until Year 44 and would require services for this extended period.

- **Impact 3.17.3.5-4**: The Partial Backfill Alternative would result in a substantial demand for public services.

  Significance of the Impact: This impact is considered significant and has both beneficial and potentially adverse aspects. Nevertheless, it is suggested that EML and Eureka County build on previous and current planning efforts to address public infrastructure and service issues. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.5.5 Public Fiscal Effects

Effects of this alternative would be similar to the Proposed Action; however, the time frame for tax revenues to Eureka County would be extended slightly during the backfill operations. In addition, net proceeds would be reduced, as compared to the Proposed Action, due to the additional costs associated with the backfilling operation.

- **Impact 3.17.3.5-5**: The Partial Backfill Alternative would result in a substantial increase in revenues and expenditures for Eureka County and the ECSD.

  Significance of the Impact: This impact is considered significant. While the long-term tax revenues would likely provide for increased infrastructure expenditures, it is suggested that EML and Eureka County build on previous and current planning efforts in order to prepare for the possible timing differences between expenditures and tax revenues. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.5.6 Residual Adverse Impacts

Residual adverse impacts would be similar to those associated with the Proposed Action; however, potentially adverse impacts of Project closure would be delayed.

3.17.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

The Off-Site Transfer of Ore Concentrate for Processing Alternative would include similar activities and time frames for the Project as the Proposed Action, but would eliminate the TMO production facilities. Elimination of the TMO production facilities would result in a reduction in tax revenues associated with the facility. Elimination of the TMO production facilities would also result in a slight reduction in EML employees during construction and operations of the Project (approximately 30 operations workers) and the correlative population and demands on services.

3.17.3.6.1 Economic and Employment Effects

The effects from this alternative would be similar to, but slightly less than those of the Proposed Action. The Project would generate substantial expansion of the local economy, particularly in selected sectors. The employment demand resulting from Project construction and operations

would be slightly lower than the Proposed Action, resulting in slightly lower levels of labor competition during construction and early operations.

- **Impact 3.17.3.6-1**: The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in substantial demand for employees and compete with regional employers for workers.

  Significance of the Impact: This impact is considered significant. Continued employment of an existing workforce is likely to be viewed as beneficial. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.6.2 Population Effects

The effects from this alternative would be similar to, but less than those of the Proposed Action. The population resulting from Project construction and operations would be slightly lower than the Proposed Action.

- **Impact 3.17.3.6-2**: The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in substantial growth and concentration of population.

  Significance of the Impact: This impact is considered significant. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.6.3 Housing

Effects of this alternative would be similar to, but less than those of the Proposed Action. The housing demand resulting from Project operations would be slightly lower due to the lower employment levels associated with this alternative.

- **Impact 3.17.3.6-3**: The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in substantial demand for new housing.

  Significance of the Impact: This impact is considered significant. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.6.4 Public Utilities and Services Effects

Effects of this alternative would be similar to the Proposed Action, however, the demand for public services and utilities resulting from Project operations would be slightly lower than the Proposed Action.

- **Impact 3.17.3.6-4**: The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in a substantial demand for public services.

Significance of the Impact: This impact is considered significant and has both beneficial and potentially adverse aspects. Nevertheless, it is suggested that EML and Eureka County build on previous and current planning efforts to address public infrastructure and service issues. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.6.5 Fiscal Effects

Effects of this alternative would be similar to the Proposed Action; however, there would be slightly lower demand for public infrastructure and services and there would be a reduction in tax revenues to Eureka County and the ECSD due to the elimination of the TMO production facilities.

- **Impact 3.17.3.6-5**: The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in a decrease in revenues and expenditures for Eureka County and the ECSD, compared to the Proposed Action.

  Significance of the Impact: This impact is considered significant. While the long-term tax revenues would likely provide for increased infrastructure expenditures, it is suggested that EML and Eureka County build on previous and current planning efforts in order to prepare for the possible timing differences between expenditures and tax revenues. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.6.6 Residual Adverse Impacts

The Off-Site Transfer of Ore Concentrate for Processing Alternative would have similar residual socioeconomic effects as the Proposed Action.

3.17.3.7 Slower, Longer Project Alternative

Under the Slower, Longer Project Alternative, the Project would operate at approximately one-half the production rate as described in the Proposed Action, which would result in a Project that would last approximately twice as long as the Proposed Action.

As stated in Section 2.2.4, although the Slower, Longer Project Alternative may not meet the purpose and need as stated in Section 1.4, the BLM elected to analyze this alternative in detail at the request of a cooperating agency (Eureka County). A half-production Project has not been designed **by EML because the company has stated that it would not be economically feasible and the Project would not be developed**; however, for the sake of comparison, there are several facets of a half-production rate Project that could be anticipated. Mining and processing equipment would be smaller, as would ancillary facilities (e.g., powerline supply and well field). However, ultimate disturbance would be the same as the TSFs, open pit, and WRDFs would eventually grow to the same size as in the proposed Project, albeit at half the rate.

The smaller plant size would likely result in a smaller construction work force. The operating work force would also be **approximately 30 percent** smaller than that required for the proposed Project (regardless of the size of a piece of mine or mill equipment, the same number of employees are generally required to operate and maintain the equipment). **In order to determine the operations workforce throughout the Project for the Slower, Longer Project Alternative, the duration of each segment in Figure 3.17.3 is doubled, while decreasing the magnitude by 30 percent. Figure 3.17.3 shows for the Proposed Action that approximately 370 workers would be employed for the first nine years of operation (first segment), after which the employee count would increase to about 400 from Years 10 through 19 (second segment). Therefore, for the Slower, Longer Project Alternative, approximately 260 workers would be employed for the first 18 years of operation (first segment) followed by approximately 280 employees for Years 19 through 37 (second segment).**

Since these employment numbers are not supported by engineering designs, using these values would not result in a valid quantitative assessment of socioeconomic impacts of the Slower, Longer Project Alternative. The Proposed Action was designed and engineered to result in an economically viable project. The proposed mining rate for the Proposed Action is a result of mine engineering and optimization studies conducted by EML. Estimated social and economic impacts of the Project cannot be accurately scaled by adjusting the mining rate (either up or down). An example is the modeled tax revenues. Without a re-design of the Project, projected expenses and revenues cannot be accurately predicted. Net Proceeds of Mines taxes derive from a mine's gross revenue minus the cost of production. For the Proposed Action, these values are calculated based on the Project design, including capital costs and operating expenses. The Net Proceeds of Mines taxes for the Proposed Action were projected by EML. To determine Net Proceeds of Mines taxes for the Slower, Longer Project alternative would require a re-design and the re-design would necessarily start with the mine reserve model because at a lower mining rate a financially viable project might only be possible by mining a smaller resource. The lower mining rate in such a scenario would not necessarily lead to a doubled mine life. These complexities would extend to quantification of other impacts (indirect and induced employment, total population impacts, school age children, housing demand, sales and use tax and property tax revenues, etc.). Without realistic, engineering-based inputs, the models would not produce reliable estimates of socioeconomic impacts. In short, the available information does not allow a valid quantification of impacts for the Slower, Longer Project Alternative.

Qualitatively, under this alternative profitability would be substantially reduced, as would tax revenues. Effects from this alternative would be proportionally but not in a linear manner less than the Proposed Action. The population effects **and associated effects on housing and public infrastructure and services** resulting from Project operations would be less **(approximately 30 percent less as outlined above)**; however the population would remain for **approximately** twice as long as the Proposed Action. **Fiscal impacts, both tax revenues and expenditures, would also be lower on an annual basis, as well as over the entire length of the Project, but would also last longer when compared to the Proposed Action. The remainder for this section discusses the socioeconomic impacts qualitatively and in comparison to the Proposed Action.**

3.17.3.7.1 Economic and Employment Effects

- **Impact 3.17.3.7-1**: The Slower, Longer Project Alternative would generate substantial expansion of the southern Eureka County economy similar to the Proposed Action, but at a somewhat lower rate and for a substantially longer period of time. This alternative would similarly result in substantial demand for employees but at a somewhat lower level (fewer employees) and longer period of time than the Proposed Action. Labor competition during construction and early operations would be slightly less than the Proposed Action.

  Significance of the Impact: This impact is considered significant. Continued employment of an existing workforce would likely to be viewed as beneficial. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.7.2 Population Effects

- **Impact 3.17.3.7-2**: The Slower, Longer Project Alternative would result in a substantial growth and concentration of population. Project-related population would be somewhat lower than under the Proposed Action, but the population would remain in the area for a substantially longer period of time.

  Significance of the Impact: This impact is considered significant. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.7.3 Housing

- **Impact 3.17.3.7-3**: The Slower, Longer Project Alternative would result in substantial demand for new housing. Project-related housing demand would be somewhat lower than under the Proposed Action, but occur over a substantially longer period of time. As noted in Section 3.17.3.2.3, the decrease in housing demand over a 20-year period during the reduction in mining activities and eventual closure could place a large number of housing units on the market, potentially depressing housing values in the area. Potentially negative effects of Project closure on the southern Eureka County housing market would be substantially delayed under this alternative compared to the Proposed Action.

  Significance of the Impact: This impact is considered significant. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.7.4 Public Utilities and Services Effects

- **Impact 3.17.3.7-4**: The Slower, Longer Project Alternative would result in substantial demand for public infrastructure and services, although at a somewhat lower level than

under the Proposed Action; however, demand would occur over a substantially longer period.

Significance of the Impact: This impact is considered significant and has both beneficial and potentially adverse aspects. Nevertheless, it is suggested that EML and Eureka County build on previous and current planning efforts to address public infrastructure and service issues. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.7.5 Public Fiscal Effects

Under the Slower, Longer Project Alternative, annual sales and use tax and net proceeds of mining revenues to the state, Eureka County and the ECSD would be substantially less than under the Proposed Action. However, the time frame from which tax revenues would be generated from these entities would be doubled. Project-related expenditures by Eureka County and the ECSD would be less than under the Proposed Action but would remain substantial based on the description of the alternative.

- **Impact 3.17.3.7-5**: Similar to the other action alternatives, the Slower, Longer Project Alternative would result in a substantial increase in revenues and expenditures for Eureka County and the ECSD, but the revenues would be less on an annual basis and accrue over a substantially longer period of time. At the same time, the demand on services and need for expenditures would also be lower but extend over a longer period, as compared to the Proposed Action.

  Significance of the Impact: This impact is considered significant. While the long-term tax revenues would likely provide for increased infrastructure expenditures, it is suggested that EML and Eureka County build on previous and current planning efforts in order to prepare for the possible timing differences between expenditures and tax revenues. **The implementation of mitigation measures for socioeconomic effects is beyond the jurisdiction of the BLM. See Section 3.26 of this EIS for a more detailed discussion of mitigation measures beyond the BLM's jurisdiction.**

3.17.3.7.6 Residual Adverse Impacts

The Slower, Longer Project Alternative would have the unavoidable indirect potential to adversely affect County services and facilities, **housing, population, economic conditions, and employment** through substantial growth and concentration of population.

3.18 Environmental Justice

3.18.1 Regulatory Framework

On February 11, 1994, President William Clinton issued EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. This EO was designed to focus the attention of federal agencies on the human health and environmental conditions in minority communities and low-income communities. In an accompanying Presidential memorandum, the President emphasized that existing laws, including NEPA,

provide opportunities for federal agencies to address environmental hazards in minority and low-income communities. In April of 1995, the EPA released the document titled Environmental Justice Strategy: EO 12898. The document established EPA-wide goals and defined the approaches by which the EPA would ensure that disproportionately high and adverse human health or environmental effects on minority communities and low-income communities are identified and addressed.

3.18.2 Affected Environment

3.18.2.1 Study Methods

The baseline data presented below are based upon information from the Socioeconomic Assessment (BCLLC/SDLLC 2008). The Socioeconomic Assessment is incorporated by reference. A complete copy of the report is available for review at the MLFO during normal business hours.

The Study Area for environmental justice effects of the proposed Project is southern Eureka County including the Town of Eureka, which is the only geographic area likely to experience substantial direct or indirect social or economic effects from the Project (Figure 3.17.1). This Study Area determination is based on the fact that employees may live up to 100 miles from the Project Area. Table 3.17-1 shows communities within a 100-mile commuting distance of the Project Area and the 2010 population of those communities.

EPA's Guidance For Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses (EPA 1998) suggests a screening process to identify environmental justice concerns. This two-step process defines the significance criteria for this issue; if either criteria is unmet, there is little likelihood of environmental justice effects occurring. The two-step process is as follows:

(1) Does the potentially affected community include minority or low-income populations?
(2) Are the environmental impacts likely to fall disproportionately on minority or low-income members of the community or tribal resource?

If the two-step process indicates that a potential exists for environment justice effects to occur, analyses are conducted to consider the following:

- Whether there exists a potential for disproportionate risk of high and adverse human health or environmental effects;
- Whether communities have been sufficiently involved in the decision-making process; and
- Whether communities currently suffer, or have historically suffered, from environmental and health risks and hazards.

3.18.2.2 Existing Conditions

3.18.2.2.1 Minority Population

Table 3.18-1 summarizes the ethnic composition of the study area, the State of Nevada, and the U.S. as a percentage of the total population. Racial and ethnic minorities make up 14.4 percent of the population in the study area that includes the Project Area. This is nearly 60 percent lower than the state population portion of racial and ethnic minorities. The percentage of minorities in Eureka County overall is 19.7 percent lower than the state population portion of racial and ethnic minorities. The percentage of racial minorities in the census block and in all of Eureka County is substantially lower than both the State of Nevada and the nation as a whole. The Hispanic or Latino population is the largest minority group in the study area. The percentage of Native Americans living in the analysis area is slightly higher than the statewide average, but not meaningfully higher.

Table 3.18-1: Minority Populations for Eureka Census Blocks, Nevada and the United States as a Percentage of Total Population

Ethnic Groupings	United States	Nevada	Eureka County (Single Census Track)	Eureka County Census Block Group 1-1 (Census Block Group Surrounding the Project Area)
White and Not Hispanic or Latino	69.1	65.2	84.9	85.6
American Indian and Alaska Native and Not Hispanic or Latino	0.7	1.1	1.5	1.2
Other Races, Two or More Races, and Not Hispanic or Latino	17.6	14.0	4.0	3.5
Hispanic or Latino Ethnicity	12.5	19.7	9.6	9.6
Total Racial and Ethnic Minorities[1]	**30.9**	**34.8**	**15.1**	**14.4**
Difference in Percent Minority Population Above/Below the State Average	3.9	N/A	-19.7	-20.4

Source: BCLLC/SDLLC 2008.

[1] Racial minorities include all persons identifying themselves in the census as a non-white race, including "Black or African American", "American Indian and Alaska Native", "Asian", "Native Hawaiian and Other Pacific Islander", "Some other race alone", and "Two or more races". Ethnic minorities include persons who identify themselves as Hispanic or Latino.

In accordance with the EPA's Environmental Justice Guidelines (EPA 1998), these minority populations should be identified when either:

- The minority population of the affected area exceeds 50 percent; or
- The minority population of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

For the purposes of screening for environmental justice concerns, a minority population, as defined in the EPA's guidance (EPA1998), does not exist within the study area.

3.18.2.2.2 Low-Income Populations

Table 3.18-2 presents the percentage of persons in poverty in the study area, the State of Nevada, the U.S., Eureka County, and the Project Area and surrounding areas. For this analysis, the

census block is larger than the local area that includes the Project Area due to the geographic boundaries used by the U.S. Census Bureau.

Persons in poverty at the time of the 2000 census were 13.5 percent of the population in the census block area that includes the Project Area. This is not meaningfully higher than the overall rates for Eureka County and the State of Nevada. It is important to note that no persons live within or immediately adjacent to the Project Area.

County-wide poverty data for 2004 indicate that nine percent of Eureka County residents had income below the poverty level, 3.6 percent fewer than the 2000 level. Poverty data for census block groups are not available for years beyond the 2000 census.

Table 3.18-2: Percentage of Population with Incomes Below Specific Poverty Thresholds in Areas Surrounding the Project Area and Geographic Comparison Areas

	United States	Nevada	Eureka County (Single Census Track)	Eureka County Census Block Group 1-1 (Census Block Group Surrounding the Project Area)
Percentage of Total Population: Below Poverty Level	12.4	10.5	12.6	13.5
Percentage of Total Population: Below 150 Percent of Poverty Level	20.9	18.7	19.4	20.6
Percentage of Total Population: Below 200 Percent of Poverty Level	29.6	27.7	30.2	34.2
Percentage of Low Income (Below Poverty) Population Above/Below the State Average	1.9	N/A	2.1	3.1
Percentage of Low Income (Below 200 Percent of Poverty) Population Above/Below the State Average	2.0	N/A	2.6	6.5

The percentage of persons in poverty in Eureka County is slightly above the statewide average (12.6 percent for the County contrasted with 10.5 percent for the state as a whole) and the percentage of people in poverty in the census block that contains the Project Area is 13.5 percent, which is three percent higher than the statewide average. These rates of poverty are not meaningfully higher than the statewide or national averages. Consequently, there are no environmental justice populations in southern Eureka County who are likely to be disproportionately affected by development or operation of the Project.

3.18.3 Environmental Consequences and Mitigation Measures

3.18.3.1 Significance Criteria

EPA's Guidance For Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses (EPA 1998) suggests a screening process to identify environmental justice concerns. This two-step process defines the significance criteria for this issue; if either criterion is unmet, there is little likelihood of environmental justice effects occurring. The two-step process is as follows:

(1) Does the potentially affected community include minority or low-income populations?
(2) Are the environmental impacts likely to fall disproportionately on minority or low-income members of the community or tribal resource?

If the two-step process indicates that there exists a potential for environment justice effects to occur, analyses are conducted to consider the following:

- Whether there exists a potential for disproportionate risk of high and adverse human health or environmental effects;
- Whether communities have been sufficiently involved in the decision-making process; and
- Whether communities currently suffer, or have historically suffered, from environmental and health risks and hazards.

3.18.3.2 Assessment Methodology

The socioeconomic characteristics of the study area, County, and communities are first analyzed for the presence of minority or low-income populations. Second, if minority or low-income populations are identified based on the EPA's Environmental Justice Guidelines (EPA 1998), the Project and alternatives are evaluated for potential effects which may be expected to disproportionally impact any such populations. If the two-step process above indicates that a potential for environmental justice effects exists, additional analyses under the significance criteria are then applied to determine if the adverse effects would be considered significant impacts if the Project or an alternative were implemented. As previously stated, there are no environmental justice populations in southern Eureka County who are likely to be disproportionately affected by development or operation of the Project.

3.18.3.3 Proposed Action

3.18.3.3.1 Environmental Justice Effects

Initial analyses concluded that the potential effects of the Proposed Action under any of the proposed stages of development would not be expected to disproportionately affect any particular population. The area in the immediate vicinity of the proposed Project is sparsely inhabited, with the nearest residences located approximately five miles to the east and west. The nearest residential areas are located in Diamond Valley and the Town of Eureka, approximately 20 and 23 miles southeast of the Project Area, respectively. Crescent Valley does not have an unusually high minority or low-income population, but does have a substantially greater proportion of Whites compared to the rest of the State of Nevada (see Table 3.18-1). Environmental effects that may occur at a distance from the Project Area, such as auditory resource or air quality impacts, would affect the area's population equally, without regard to nationality or income level; however, a second provision of this criteria requires consideration of "impacts that may affect a cultural, historical, or protected resource of value to an Indian Tribe or a minority population, even when the population is not concentrated in the vicinity." According to Section 3.21, no traditional cultural properties or EO 13007 (EO on Indian Sacred Sites) sites have been identified within the Project Area that might be impacted by the Proposed Action; therefore, there are no impacts associated with the Proposed Action on traditional Native American concerns.

On the basis of the second part of the criteria, the Proposed Action would not result in a disproportionate effect on a minority population. No further environmental justice analyses are required because there is no disproportionate effect on an identified minority population as a result of the Proposed Action.

3.18.3.3.2 Residual Effects

There are no residual adverse effects associated with the Proposed Action.

3.18.3.4 No Action Alternative

3.18.3.4.1 Environmental Justice Effects

Initial analyses concluded that the potential effects of the No Action Alternative would not be expected to disproportionately affect any particular population. The area in the immediate vicinity of the proposed Project is sparsely inhabited, with the nearest residences located approximately five miles to the east and west. The nearest residential areas are located in Diamond Valley and the Town of Eureka, approximately 20 and 23 miles southeast of the Project Area, respectively. Crescent Valley does not have an unusually high minority or low-income population, but does have a substantially greater proportion of Whites compared to the rest of the State of Nevada (see Table 3.18-1). Environmental effects that may occur at a distance from the Project Area, such as auditory or air quality impacts, would affect the area's population equally, without regard to nationality or income level; however, a second provision of this criteria requires consideration of "impacts that may affect a cultural, historical, or protected resource of value to an Indian Tribe or a minority population, even when the population is not concentrated in the vicinity." According to Section 3.21, no traditional cultural properties or EO 13007 (EO on Indian Sacred Sites) sites have been identified within the Project Area that might be impacted by the No Action Alternative; therefore, there are no impacts associated with the No Action Alternative on traditional Native American concerns.

On the basis of the second part of the criteria, the No Action Alternative would not result in a disproportionate effect on a minority population. No further environmental justice analyses are required because there is no disproportionate effect on an identified minority population as a result of the No Action Alternative.

3.18.3.4.2 Residual Effects

There are no residual adverse effects associated with the No Action Alternative.

3.18.3.5 Partial Backfill Alternative

3.18.3.5.1 Environmental Justice Effects

Initial analyses concluded that the potential effects of the Partial Backfill Alternative would not be expected to disproportionately affect any particular population. The area in the immediate vicinity of the proposed Project is sparsely inhabited, with the nearest residences located approximately five miles to the east and west. The nearest residential areas are located in Diamond Valley and the Town of Eureka, approximately 20 and 23 miles southeast of the Project Area, respectively. Crescent Valley does not have an unusually high minority or low-

income population, but does have a substantially greater proportion of Whites compared to the rest of the State of Nevada (see Table 3.18-1). Environmental effects that may occur at a distance from the Project Area, such as auditory or air quality impacts, would affect the area's population equally, without regard to nationality or income level; however, a second provision of this criteria requires consideration of "impacts that may affect a cultural, historical, or protected resource of value to an Indian Tribe or a minority population, even when the population is not concentrated in the vicinity." According to Section 3.21, no traditional cultural properties or EO 13007 (EO on Indian Sacred Sites) sites have been identified within the Project Area that might be impacted by the Partial Backfill Alternative; therefore, there are no impacts associated with the Partial Backfill Alternative on traditional Native American concerns.

On the basis of the second part of the criteria, the Partial Backfill Alternative would not result in a disproportionate effect on a minority population. No further environmental justice analyses are required because there is no disproportionate effect on an identified minority population as a result of the Partial Backfill Alternative.

3.18.3.5.2 Residual Effects

There are no residual adverse effects associated with the Partial Backfill Alternative.

3.18.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

3.18.3.6.1 Environmental Justice Effects

Initial analyses concluded that the potential effects of the Off-Site Transfer of Ore Concentrate for Processing Alternative would not be expected to disproportionately affect any particular population. The area in the immediate vicinity of the proposed Project is sparsely inhabited, with the nearest residences located approximately five miles to the east and west. The nearest residential areas are located in Diamond Valley and the Town of Eureka, approximately 20 and 23 miles southeast of the Project Area, respectively. Crescent Valley does not have an unusually high minority or low-income population, but does have a substantially greater proportion of Whites compared to the rest of the State of Nevada (see Table 3.18-1). Environmental effects that may occur at a distance from the Project Area, such as auditory or air quality impacts, would affect the area's population equally, without regard to nationality or income level; however, a second provision of this criteria requires consideration of "impacts that may affect a cultural, historical, or protected resource of value to an Indian Tribe or a minority population, even when the population is not concentrated in the vicinity." According to Section 3.21, no traditional cultural properties or EO 13007 (EO on the Indian Sacred Sites) sites have been identified within the Project Area that might be impacted by the Off-Site Transfer of Ore Concentrate for Processing Alternative; therefore, there are no impacts associated with this alternative on traditional Native American concerns.

On the basis of the second part of the criteria, the Off-Site Transfer of Ore Concentrate for Processing Alternative would not result in a disproportionate effect on a minority population. , No further environmental justice analyses are required because there is no disproportionate effect on an identified minority population as a result of the Off-Site Transfer of Ore Concentrate for Processing Alternative.

3.18.3.6.2 Residual Effects

There are no residual adverse effects associated with the Off-Site Transfer of Ore Concentrate for Processing Alternative.

3.18.3.7 Slower, Longer Project Alternative

3.18.3.7.1 Environmental Justice Effects

Initial analyses concluded that the potential effects of the Slower, Longer Project Alternative under any of the proposed stages of development would not be expected to disproportionately affect any particular population. The area in the immediate vicinity of the proposed Project is sparsely inhabited, with the nearest residences located approximately five miles to the east and west. The nearest residential areas are located in Diamond Valley and the Town of Eureka, approximately 20 and 23 miles southeast of the Project Area, respectively. Crescent Valley does not have an unusually high minority or low-income population, but does have a substantially greater proportion of Whites compared to the rest of the State of Nevada (see Table 3.18-1). Environmental effects that may occur at a distance from the Project Area, such as auditory or air quality impacts, would affect the area's population equally, without regard to nationality or income level; however, a second provision of this criteria requires consideration of "impacts that may affect a cultural, historical, or protected resource of value to an Indian Tribe or a minority population, even when the population is not concentrated in the vicinity." According to Section 3.21, no traditional cultural properties or EO 13007 (EO on Indian Sacred Sites) sites have been identified within the Project Area that might be impacted by the Proposed Action; therefore, there are no impacts associated with the Proposed Action on traditional Native American concerns.

On the basis of the second part of the criteria, the Slower, Longer Project Alternative would not result in a disproportionate effect on a minority population.

3.18.3.7.2 Residual Effects

There are no residual adverse effects associated with the Slower, Longer Project Alternative.

3.19 Hazardous Materials

3.19.1 Regulatory Framework

Federal hazardous material and waste laws and regulations would be applicable to hazardous substances used, stored, or generated by the Project. Applicable federal laws would include the following: the RCRA; Hazardous and Solid Waste Amendments (HSWA); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; aka Superfund); and Superfund Amendments and Reauthorization Act (SARA). Pursuant to regulations promulgated under Section 102 of CERCLA, as amended, release of a reportable quantity of a hazardous substance to the environment in a 24-hour period must be reported to the National Response Center (40 CFR Part 302). A release of reportable quantity on public land must also be reported to the BLM.

Similarly, Nevada hazardous material and waste laws and regulations would be applicable to hazardous substances used, stored, and generated by the Project. NAC 445A.240 requires immediate reporting of a release of a reportable quantity of a hazardous substance to the Nevada Division of Emergency Management. Specific information on hazardous materials that would be associated with the Project is discussed in Section 2.1.11.

All hazardous substances would be transported by commercial carriers or vendors in accordance with the requirements of 49 CFR, which requires that all shipments of hazardous substances be properly identified and placarded. Shipping papers must be accessible and include information describing the substance, immediate health hazards, fire and explosion risks, immediate precautions, fire-fighting information, procedures for handling leaks or spills, first aid measures, and emergency response telephone numbers. Title 49 CFR also requires that the carrier notify local emergency response personnel, the National Response Center (for discharge of reportable quantities of hazardous substances to navigable waters), and the U.S. Department of Transportation (USDOT) in the event of an accident involving hazardous substances. Carriers would be licensed and inspected as required by the NDOT. Tanker trucks would be inspected and have a Certificate of Compliance issued by the Nevada Motor Vehicle Division. The permits, licenses, and certificates are the responsibility of the carrier.

In 1999, the metal mining industry began submitting reports on release of chemicals to the EPA and appropriate state agencies, under Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986; commonly referred to as the Toxics Release Inventory (TRI) Program. Reports are due on July 1st for the previous reporting year. The EPCRA also requires industries to participate in emergency planning and to notify their communities of the existence of, and routine and accidental releases of, any chemical on the TRI chemical list. The goal is to help citizens, government officials, and community leaders to be better informed about the industrial use of chemicals in their communities. The TRI program was originally developed for manufacturing facilities that use man-made chemicals to produce other man-made chemicals (such as the synthetic organic chemical industry).

Data are submitted annually by covered facilities on TRI Form Rs. Data are reported by individual chemical or chemical group on a facility basis. On the federal level, the EPA checks these data on the Form Rs for reporting errors and then compiles them into a centrally managed database. Each year, over 80,000 reports, representing billions of pounds of released chemicals, are submitted to the EPA by more than 20,000 private facilities and 200 federal facilities.

3.19.2 Affected Environment

3.19.2.1 Study Methods

The baseline data presented below are based upon information from the Plan (EML 2006). Additional information has been obtained from public agency maps and reports, and from telephone communications with federal, state, county, and community officials.

3.19.2.2 Existing Conditions

The study area includes highways and road facilities that could reasonably be assumed to be used or needed for the transportation of hazardous materials to the Project Area. The affected environment for hazardous materials include air, water, soil, and biological resources that could

be potentially affected by an accidental release of hazardous materials during transportation to and from the Project Area, and during storage and use within the Project Area.

SR 278, which connects Carlin and Eureka passes through the eastern edge of the Project Area. NDOT traffic count data for 2010 indicates that the average daily trips on SR 278 are **570 to the north of the Project Area in the northern portion of Pine Valley and 490 south of the Project Area near the intersection with U.S. Highway 50** (NDOT 2011). Approximately **175** of these trips on SR 278 are trucks (**NDOT 2011**). There appears to be between **eight** and **56** of these trucks per day, depending on the day of the week, would be transporting hazardous material shipments on SR 278 (Enviroscientists 2011b).

The Project Area is also currently subject to some drilling activities associated with mineral exploration. Hazardous materials currently used in conjunction with exploration activities to operate and maintain equipment include petroleum motor fuels and lubricants, antifreeze, and solvents. The hazardous materials are brought to the exploration site in small amounts for daily consumption.

3.19.3 Environmental Consequences and Mitigation Measures

3.19.3.1 Significance Criteria

Impacts associated with hazardous materials would be considered significant if an action could result in any of the following:

- One or more accidents during transport, resulting in the release of a reportable quantity of a hazardous material; or
- Release of a hazardous material on the site exceeding the storage volume of the secondary containment structure.

3.19.3.2 Assessment Methodology

To evaluate impacts from hazardous materials, the Proposed Action and alternatives are reviewed against existing conditions and local transportation plans. Environmental consequences related to public safety are evaluated by reviewing relevant state and federal guidelines for public safety and the proposed Project processes and operations. It is assumed that the Proposed Action and alternatives would comply with all applicable county, state, and federal regulations with relevant public safety implications. The significance criteria are then applied to determine if the adverse effects would be considered significant impacts if the Project or an alternative were implemented.

3.19.3.3 Proposed Action

The Proposed Action affects public safety primarily through the use of chemicals on site, some of which may be classified as hazardous, and the transport of those chemicals to and from the Project Area on public roads. The impacts of hazardous materials use and transport are discussed fully below.

As described in Section 2.1.11 and Table 2.1-6, the mining and ore processing operations under the Proposed Action would involve the transportation, use, and storage of the following materials

that could be classified as hazardous: (a) diesel fuel, gasoline, oils, greases, anti-freeze, and solvents used for equipment operation and maintenance; (b) ferric chloride, sodium metasilicate, pine oil, diesel fuel, hydrochloric acid, flocculants, antiscalants, and other chemicals used in the **Mo** extraction processes; (c) **ammonium nitrate, fuel oil,** and other explosive agents used for blasting in the open pit; and (d) TMO and FeMo, which would be the products of the Project.

Trucks would be used to transport hazardous materials to the Project Area, generally from the Elko area (located approximately 85 miles from the Project Area), but could also come through the Ely area and Eureka from Utah. It is assumed that the primary transportation route would be west from Elko on I-80 to the **SR 278** exit (approximately 20 miles), then south on SR 278 through Pine Valley to the Project Area (approximately 65 miles). The primary transportation route travels through the communities of Elko and Carlin. The secondary transportation route travels through the communities of Ely and Eureka.

The environmental effects of a release would depend on the substance, quantity, timing, and location of the release. The event could range from a minor oil spill at the Project Area where cleanup equipment would be readily available, to a severe spill during transport involving a large release of diesel fuel adjacent to the Humboldt River. Some of the chemicals could have immediate adverse effects on water quality and aquatic resources if spills were to enter streams. Spills of hazardous materials could seep into the ground and contaminate ground water resources. Depending on the proximity of people to such spills or the use of degraded water for human consumption, an accidental spill could affect human health.

3.19.3.3.1 Transportation Impacts

Based on the quantity of material used and number of deliveries, the hazardous materials of greatest concern under the Proposed Action are diesel fuel, ammonium hydroxide, ANFO, TMO, and FeMo. Diesel fuel would be delivered to the Project Area in tanker trucks with a 12,000-gallon capacity. Ammonium hydroxide would also be shipped as a liquid in 5,000-gallon tanker trucks. **Explosives** in the form of solid ammonium nitrate would be shipped in 25-ton trucks and mixed with fuel oil on site. The TMO and FeMo would be shipped off site as a solid in 25-ton trucks. Based on the capacity of the delivery vehicles, the Project Area would receive approximately 2,488 tanker deliveries of diesel fuel annually, 204 tanker truck deliveries of ammonium hydroxide annually, and 312 trucks delivering ammonium nitrate annually. In addition, the Project would have approximately 1,800 trucks annually shipping product from the facility. On average this would total **26** trucks trips per day with the inclusion of the toll roasting.

The probability of an accident (i.e., release) occurring during transportation of the four substances was calculated using the **Federal Motor Carrier Safety Administration (**FMCSA) truck accident statistics (FMCSA 2001). According to these statistics, the average rate of truck accidents varies depending on the type of material being transported. For Class 2.1 flammable materials, the average rate is 0.36 accident per million miles traveled. The average rate of truck accidents for Class 9 miscellaneous dangerous goods is 1.09 accidents per million miles traveled.

The potential for a spill or release was based on accident statistics for liquid tankers carrying hazardous materials (FMCSA 2001). These statistics indicate that, on average, 17 percent of accidents involving Class 2.1 flammable materials resulted in a spill or release. Also, these statistics indicate that, on average, 33.6 percent of accidents involving Class 9 miscellaneous dangerous goods resulted in a spill or release. The probability of a spill resulting from a truck

carrying hazardous materials is calculated in Table 3.19-1. The analysis indicates that the potential for an accidental hazardous materials release is very low. The calculated potential of a spill per year along the entire truck route for the life of the Project under the Proposed Action is approximately 0.01 for deliveries of diesel fuel, 0.01 for deliveries of ammonium hydroxide, 0.01 for deliveries of ANFO, and 0.06 for shipments of TMO. If there was a spill, the local emergency response jurisdiction where the spill occurred would respond.

Table 3.19-1: Estimate of Annual Number of Spills Resulting from Truck Accidents Under the Proposed Action

Substance	Total Truck Deliveries Per Year	One-Way Haul Distance (miles)	Accident Rate Per Million Miles Traveled[a]	Calculated Number of Accidents Per Year	Probability of Release Given an Accident[b]	Calculated Number of Spills Per Year[c]
Diesel Fuel	1,488	85	0.36	0.09	17.0%	0.01
Ammonium Hydroxide	204	85	1.09	0.04	33.6%	0.01
Ammonium Nitrate	312	85	1.09	0.06	33.6%	0.01
TMO (FeMo)	1,800	85	1.09	0.33	33.6%	0.06
Toll Roasting	1,200	Nk	1.09	0.33	33.6%	0.18[d]

a Accident rates are based on the average number of truck accidents occurring per million road miles traveled by road types.
b Spill probabilities are based on statistics from accident reports that indicate the percentage of truck accidents involving liquid tankers that resulted in spills.
c Spills are based on a one-way loaded haul distance and the return trip is empty.
d For the calculation, an assumed travel distance of 250 miles was used.

Source: FMCSA 2001.

3.19.3.3.2 Storage and Use Impacts

Over the life of the Project, the probability of minor spills of materials such as oils and lubricants would be relatively high. These releases could occur as a result of a bad connection on an oil supply line, an equipment failure, or human error. Spills of this nature would be localized, contained, and appropriately cleaned up and disposed of at an authorized facility. EML would have the necessary spill containment and cleanup equipment available on site, and personnel would be able to respond quickly. The design of the processing operations and hazardous materials storage facilities would minimize the potential for an upset that results in a major spill. Process systems are designed so that any spilled solution drains to a collection area where spillage can return to the system and are also designed to prevent spills during extreme storm events. Stored chemicals are protected from the elements. Petroleum fuels are stored in aboveground tanks or tanks in series and surrounded with a containment structure to accommodate at least 110 percent of the volume of the largest tank within the containment area.

All hazardous materials would be handled in accordance with applicable MSHA regulations. The hazardous substances to be used for the Proposed Action would be handled as recommended in the manufacturer's Material Safety Data Sheet (MSDS). With the proposed design features and operational practices in place, the probability of a release occurring at the mill or processing sites, or chemical storage areas, would not be significant.

3.19.3.3.3 Effects of a Release

The environmental effects of a release would depend on the material released, the quantity released, and the location. Potential effects of the four chemicals of concern, diesel fuel, ammonium hydroxide, ANFO, and TMO, are described below.

A direct release of diesel fuel would kill vegetation if direct contact occurred. Although extremely unlikely, a diesel fuel spill could ignite a rangeland fire. A direct release into a water body could contaminate water and sediments, possibly impacting local aquatic populations; however, due to the anticipated rapid response and cleanup of a diesel fuel spill, long-term increases of hydrocarbons in soils, surface water, or ground water are not expected to result.

A direct release of ammonium hydroxide would kill vegetation if direct contact occurred due to the extremely high pH. A direct release into a water body could contaminate water and sediments, possibly impacting local aquatic populations; however, due to the anticipated rapid response and cleanup of an ammonium hydroxide spill, long-term increases of ammonium hydroxide in soils, surface water, or ground water are not expected to result.

The effects of an ammonium nitrate or a TMO spill would be limited because both materials are in a solid form. Any spilled materials could be picked up and controlled; however, minor amounts may mix with surface soils. Should a spill occur into surface water or during a precipitation event, then the spilled materials could migrate from the spill site either as a dissolved or suspended material. This potential impact could occur until the spilled materials are cleaned up.

A large-scale release of a hazardous material could have implications for public health and safety; however, the probability of a release anywhere along the transportation route was calculated to be low, and the probability of a release within a populated area or that would cause an injury or fatality would be lower still. A release involving severe effects to human health or safety is not expected to occur during the life of the Project. In addition, none of the process chemicals or fuels used in large quantities are carcinogenic; therefore, no increases in cancer risk as a result of a release or Project processing activities are expected.

In the event of an off-site release during transport, the transportation company would be responsible for first response and clean-up. Each transportation company would develop a spill plan, or equivalent, to address the materials they would be transporting. Local and regional law enforcement and fire protection agencies may also be involved initially to secure the site and protect public safety. In addition, the Chemical Manufacturers' Association maintains the Chemical Transportation Emergency Center, which has a 24-hour "hotline" to provide information, advice, and assistance in identification and mitigation of chemical emergency scenes.

To prevent the escape of pollutants from on-site containment facilities and to ensure subsequent cleanup as necessary for petroleum products at existing facilities, EML has prepared a Spill Contingency Plan, which is consistent with State of Nevada Regulations (NAC 445A.242 and 445A.243). The plan establishes procedures and methods to be implemented to abate and cleanup an on-site hazardous material spill. If required, spills occurring at the Project Area would be reported to the appropriate federal and state agencies.

- **Impact 3.19.3.3-1:** A spill of hazardous materials could adversely affect public safety and the environment.

  Significance of the Impact: This impact is considered less than significant; however, the following mitigation measure is provided to reduce the adverse effects of this potential impact.

- **Mitigation Measure 3.19.3.3-1:** EML would maintain their existing Emergency Response Plan (EML 2006; Appendix 11).

- **Effectiveness of Mitigation and Residual Effects:** The implementation of this mitigation measure would result in EML completing the necessary steps to understand how to respond to emergency situations with hazardous materials. This mitigation measure would be effective when an emergency condition develops because EML would have completed readiness preparation for responding to the emergency conditions.

3.19.3.3.4 Residual Adverse Impacts

The Proposed Action would have the unavoidable indirect potential to adversely affect employee or public safety through the accidental spill or release of hazardous materials either during transport to the Project Area, or from activities within the Project Area; however, due to the low probability of a significant accidental hazardous materials spill or release, the unavoidable potential impact is considered less than significant.

3.19.3.4 No Action Alternative

3.19.3.4.1 Effects of a Release

Under the No Action Alternative, EML is currently conducting mineral exploration and data acquisition within the Project Area; therefore the potential for impacts to public safety or the environment from the use and transportation of hazardous materials is substantially less than under the Proposed Action.

- **Impact 3.19.3.4-1:** A spill of hazardous materials could adversely affect public safety and the environment.

  Significance of the Impact: This impact is considered less than significant, and no mitigation measures are proposed.

3.19.3.4.2 Residual Adverse Impacts

The No Action Alternative would have the unavoidable indirect potential to adversely affect employee or public safety through the accidental spill or release of hazardous materials either during transport to the Project Area, or from currently permitted activities within the Project Area; however, due to the very low probability of a significant accidental hazardous materials spill or release, the unavoidable potential impact is considered less than significant.

3.19.3.5 Partial Backfill Alternative

3.19.3.5.1 Effects of a Release

Impacts to public safety from the use and transport of hazardous materials would generally be similar as those described for the Proposed Action. The difference in impacts would be an increase in the amount of materials transported to the site after Year 32 because of the continued use of the mining fleet to complete the backfilling operations.

- **Impact 3.19.3.5-1:** A spill of hazardous materials could adversely affect public safety and the environment.

  Significance of the Impact: This impact is considered less than significant: however, the following mitigation measure is provided to reduce the adverse effects of this potential impact.

- **Mitigation Measure 3.19.3.5-1:** EML would maintain their existing Emergency Response Plan (EML 2006; Appendix 11).

- **Effectiveness of Mitigation and Residual Effects:** The implementation of this mitigation measure would result in EML completing the necessary steps to understand how to respond to emergency situations with hazardous materials. This mitigation measure would be effective when an emergency condition develops because EML would have completed readiness preparation for responding to the emergency conditions.

3.19.3.5.2 Residual Adverse Impacts

The Partial Backfill Alternative would have the unavoidable indirect potential to adversely affect employee or public safety through the accidental spill or release of hazardous materials either during transport to the Project Area, or from activities within the Project Area; however, due to the low probability of a significant accidental hazardous materials spill or release, the potential impact is considered less than significant.

3.19.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

3.19.3.6.1 Effects of a Release

Impacts to public safety from the use and transport of hazardous materials would generally be the same as those described for the Proposed Action. The difference in impacts would be a slight reduction in the amount of materials transported to the site because there would not be the TMO production facilities. There would be a similar amount of product transported off site; however, the material would be molybdenum sulfide rather than TMO.

- **Impact 3.19.3.6-1:** A spill of hazardous materials could adversely affect public safety and the environment.

  Significance of the Impact: This impact is considered less than significant; however, the following mitigation measure is provided to reduce the adverse effects of this potential impact.

- **Mitigation Measure 3.19.3.6-1:** EML would maintain their existing Emergency Response Plan (EML 2006; Appendix 11).

- **Effectiveness of Mitigation and Residual Effects:** The implementation of this mitigation measure would result in EML completing the necessary steps to understand how to respond to emergency situations with hazardous materials. This mitigation measure would be effective when an emergency condition develops because EML would have completed readiness preparation for responding to the emergency conditions.

3.19.3.6.2 Residual Adverse Impacts

The Off-Site Transfer of Ore Concentrate for Processing Alternative would have the unavoidable indirect potential to adversely affect employee or public safety through the accidental spill or release of hazardous materials either during transport to the Project Area, or from activities within the Project Area; however, due to the low probability of a significant accidental hazardous materials spill or release, the potential impact is considered less than significant.

3.19.3.7 Slower, Longer Project Alternative

3.19.3.7.1 Effects of a Release

Impacts to public safety from the use and transport of hazardous materials would generally be proportionally less than those described for the Proposed Action. The difference in impacts would be a slight decrease in the amount of materials transported annually.

- **Impact 3.19.3.7-1:** A spill of hazardous materials could adversely affect public safety and the environment.

  Significance of the Impact: This impact is considered less than significant; however, the following mitigation measure is provided to reduce the adverse effects of this potential impact.

- **Mitigation Measure 3.19.3.7-1:** EML would maintain their existing Emergency Response Plan (EML 2006; Appendix 11).

- **Effectiveness of Mitigation and Residual Effects:** The implementation of this mitigation measure would result in EML completing the necessary steps to understand how to respond to emergency situations with hazardous materials. This mitigation measure would be effective when an emergency condition develops because EML would have completed readiness preparation for responding to the emergency conditions.

3.19.3.7.2 Residual Adverse Impacts

The Slower, Longer Project Alternative would have the unavoidable indirect potential to adversely affect employee or public safety through the accidental spill or release of hazardous materials either during transport to the Project Area, or from activities within the Project Area; however, due to the low probability of a significant accidental hazardous materials spill or release, the potential impact is considered less than significant.

3.20 Historic Trails

3.20.1 Regulatory Framework

The Pony Express Trail is the only historic trail within or adjacent to the Project Area. In 1992 the US Congress amended the National Trails System Act to include the California and Pony Express Trails. The act directs the Secretary of Interior to provide for the development and maintenance of the trails within federally administered areas. To this end, the BLM issued two IMs in 2003 that address the management and assessment of potential impacts to the trail. One of these IMs, NV-2204-004, specifically addressed the evaluation of potential effects under the National Trails System Act. In addition, information in this section was compiled from the Comprehensive Management and Use Plan Final EIS for the California National Historic Trail and the Pony Express National Historic Trail (NPS 1999).

The Pony Express Trail is considered a historic property, and Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470, et seq.) (NHPA), and its implementing regulations under 36 CFR 800 require all federal agencies to consider effects of federal actions on cultural resources eligible for or listed in the NRHP. Other laws related to NHPA with which agencies must comply include, but are not limited to, the following:

- Archaeological and Historic Preservation Act of 1974 (AHPA); and
- Archaeological Resource Protection Act of 1979 (ARPA).

3.20.2 Affected Environment

3.20.2.1 Study Methods

The cultural resources inventory for the Project was used to develop the description of the Pony Express Trail activities and the physical features of the trail within and adjacent to the Project Area (Kautz 2007). EML's assessment of the viewshed from the Pony Express trail within the Project Area was used in the impact assessment. Google Earth Pro^{R} was used to determine the viewshed from the trail outside of the Project Area.

3.20.2.2 Historic Development

The Pony Express was a short-lived horse-and-rider relay that carried light mail between Missouri and California in 1860 and 1861. Westbound from St. Joseph, the Pony Express followed the established emigrant trails to Salt Lake City and then continued through Nevada along the Central Overland mail and military route developed by George Chorpenning, Howard Egan, and Army Captain James Simpson. The trail crossed the Sierra Nevada at Carson Pass, ending in Sacramento. Eastbound mail followed the same route back to St. Joseph. The operation had approximately 150 stations, 500 horses, and 80 riders - some of whom earned celebrity for their courage and feats of physical endurance. Though the Pony Express has become highly mythologized, it was in fact historically important for demonstrating that mail could be expedited year-round between east and west, and for its role in carrying important news and dispatches to California on the cusp of the Civil War. The first ride began on April 3, 1860. The Pony Express' parent company, the Central Overland California & Pike's Peak Express Co., went bankrupt largely due to a string of bad business decisions and misfortunes unrelated to the Pony Express. Although that operation was a financial failure, this failure was also brought on because

Congress never awarded the government contract. The Pony Express closed because completion of the transcontinental telegraph on October 24, 1861, eliminated the need for overland express mail, which made the Pony Express obsolete. The Pony Express shut down two days later on October 26, 1861. Figure 3.20.1 shows the location of the Pony Express Trail in the vicinity of the Project Area.

The numerous stations that were constructed along the Pony Express Trail across the Great Basin provided fresh mounts for the riders but are also historically important in that they mark the inception of nonnative occupation in the area. Several of the stations developed into ranches that are still in operation today.

3.20.2.3 Existing Conditions

The portion of the historic trail in the vicinity of the Project Area has been identified as the Overland Canyon to Simpson Park Station Segment (NPS 1999). In the vicinity of the Project Area the trail is a two-track dirt road, which is used for general public land access, access by grazing permittee, and by recreationists. The Comprehensive Management and Use Plan Final EIS for the California and Pony Express National Historic Trails identified high potential segments and sites along these trails (NPS 1999). This segment has been determined to be a high potential segment of the Pony Express Trail. A high potential segment is one having greater than average scenic values or affording an opportunity to vicariously share the experience of the original users of a historic route, and is relatively free from intrusion. **Additionally, as stated in Section 3.21.3, segments of the Pony Express Trail in the vicinity of the Project Area are considered eligible for listing in the NRHP.**

A high potential site is an area along the trail that exhibits visible historic remnants, conveys historic significance, retains scenic quality, and is relatively free from intrusion. There are no high potential sites in the Project Area. Even though the Pony Express Trail crosses the Project Area, no stations were located within Project Area. The closest Pony Express stations were located at Roberts Creek Ranch, just 0.6 mile west of the Project Area, and Sulphur Springs, which is 4.3 miles east of the Project Area. Both locations are now private land, and there are no remains of the structures (Kautz 2007).

There are a number of organizations that promote and support the Pony Express Trail and the memory of the Pony Express system. Their activities include the placement and maintenance of trail markers, as well as conducting the Pony Express re-ride. The re-ride is an annual event that generally occurs in June between St. Joseph, Missouri and Sacramento, California. The re-ride, which is sponsored by the National Pony Express Association (NPEA), is managed within each state by that state's NPEA division. The schedule for each of the annual re-rides is set months to over a year in advance. Within each state, the divisions are given an allotted amount of time to complete the ride and the specific time for the handoff from one state to the other is defined.

Within the Nevada Division the re-ride is divided into sections and each section has a specific amount of time to complete the ride. The Project Area is within the Top of the Diamonds to Grubb's Well Section and seven hours are allocated to complete the ride. The re-ride on this section of the trail generally consists of a single rider or double riders and several support vehicles with horse trailers. This section of the trail is entirely a two-track road and vehicles can generally travel with the riders. The one exception to this is the portion of the trail through the western portion of the Project Area where the terrain would make vehicle travel with a horse

EXPLANATION

- Project Boundary
- Falcon-Gonder Power Line
- Power Line Reroute
- Existing Power Line
- TSF/Mine Power Line
- 230-kV Power Line
- Well Field Water Line
- Well Field Power Line
- Pit (50' Contours)
- Interpit Area
- Low Grade Ore Stockpile (25' Contours)
- Tailing Storage Facilities (20' Contours)
- Waste Rock Disposal Facilities (20' Contours)
- Yards

Pony Express Trail

- Project Facilities Visible
- Project Facilities Partially Visible
- Project Facilities Not Visible
- Trail Segment Not Evaluated for Visual Effects
- Analysis Area

N

0 2 4 6 Miles

DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD	
CHECKED: -	APPROVED: RFD	DATE: 08/01/2012	
FILE NAME: p1635_Fig3-20-1_PonyExpressTrail_v2.mxd			

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Pony Express Trail

Figure 3.20.1

BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

trailer unsafe. There are also other organizations that support the Pony Express Trail that conduct individual or group rides on segments or the entire length of the trail. In 2006 there were 45 re-ride participants on the segment of the trail within the Project Area. In 2010 there were a total **of 215 individuals that used the segment of the trail within the Project Area (Personal Communication, Gary Nezo, current National Pony Express Association, Nevada Branch President).**

3.20.3 Environmental Consequences and Mitigation Measures

Major issues related to the Pony Express Trail include the following: a) changes to the viewshed as seen from the Pony Express Trail; and b) access to the Pony Express Trail within the Project Area.

3.20.3.1 Significance Criteria

Impacts to historic trails would be considered significant if the Proposed Action or alternatives result in any of the following:

- Changes to the landscape adjacent to a historic trail that cannot be mitigated to a BLM Class II VRM objective, as outlined in BLM IM NV-2004-004; or
- Limiting the use of an identified portion of a historic trail.

3.20.3.2 Assessment Methodology

Potential impacts of the Proposed Action and Project alternatives were assessed based on the guidance in BLM IM NV-2004-004. The assessment is based on the potential effects within three miles of the centerline of the designated trail. The criterion for the evaluation is based on the BLM VRM Class II threshold.

3.20.3.3 Proposed Action

3.20.3.3.1 Historic Trail Viewshed

The Proposed Action would modify the existing viewshed through mining the top portion of the mountain known as Mount Hope and creating visible highwalls, the construction of WRDFs adjacent to the location of Mount Hope, all north of the historic trail, and the construction of two TSFs south of the historic trail. In addition, a number of Project-related activities would occur immediately adjacent to the historic trail with the initial Project development, that include the following: documentation, interpretation, and protection of historic trail remnants and associated structures; the construction of a 900-foot underpass through and subsequently beneath the historic trail for the Project tailings lines; the construction of an underground waterline and an above and below ground powerline adjacent to the historic trail for a distance of eight miles to the west of the mine facilities; and construction of water development facilities to the north and south of the historic trail in Kobeh Valley.

This impact is limited to those areas where the Project is visible from the historic trail. Due to the local topography, proximity to the Proposed Action is not always directly correlated to the degree of impact. There are a number of areas, as shown on Figure 3.20.1, immediately adjacent to the Project where there is no impact to the viewshed from the historic trail, in contrast to areas

three miles from the mine area in Kobeh Valley where the Project activities are plainly visible. As a result, the potential impact of the Project is sporadic; however, the overall effect of the Project on the viewshed of this portion of a high potential segment of the historic trail is one of a changed landscape from the point that the Project is visible at the three mile assessment distance. Once any riders pass the Project facilities, then the Project is no longer in the individual's direct line of sight unless the individual turns around to again to look back at the Project facilities.

The below ground activities that would occur beneath and adjacent to the historic trail would decrease in visual contrast as the Project reclamation measures take effect; however, the removal of a portion of Mount Hope, the construction of the open pit, WRDFs, and the North TSF would be permanent changes to the viewshed that would be diminished with reclamation. The South TSF would be constructed beyond the three-mile assessment boundary.

- **Impact 3.20.3.3-1:** The Proposed Action would permanently modify the viewshed from the historic trail within three miles of the centerline to a degree that is not consistent with the BLM VRM Class II threshold.

  Significance of the Impact: This potential impact to the historic trail is significant. **The following mitigation has been identified for this impact**.

- **Mitigation Measure 3.20.3.3-1: As part of the Historic Treatment Plan, mitigation for the historic trail would include photodocumentation to capture the setting and feel of the Pony Express Trail adjacent to the Project that would be visually impacted. The Treatment Plan would also include off-site mitigation in the form of GPS mapping and surveying of off-site portions of the Pony Express Trail located on public land. Segments would be selected at a one to one ratio of linear mileage based on the length of segments of the trail that would be impacted by the Project and are considered eligible as discussed in Section 3.21.3. Additionally, Mitigation Measure 3.7.3.3-1 would reduce visual impacts to users of the Pony Express Trail.**

- **Effectiveness of Mitigation and Residual Effects: The effectiveness of this mitigation in reducing the impact to less than significant is not likely; however, given the type and scale of the action this mitigation would be the most effective approach at limiting the impact. The mitigation is designed to document the user experience of those segments of the trail that would be impacted by the Project and enhance the understanding of unevaluated segments of the trail. Therefore, these measures and the ones identified in Mitigation Measure 3.7.3.3-1 would be effective at mitigating visual impacts to the Pony Express Trail.**

3.20.3.3.2 Historic Trail Access

The Proposed Action includes the construction of a public exclusion fence around the entire Project. As a result, access to that portion of the trail within the Project Area would be cut off for the duration of the Project, which could be as long as 80 years.

- **Impact 3.20.3.3-2:** The Proposed Action would eliminate access to that portion of the historic trail within the Project exclusion fence.

Significance of the Impact: This potential impact to the historic trail access is significant.

- **Mitigation Measure 3.20.3.3-2:** EML would implement the mitigation plan included in Appendix **D, Attachment 1** to provide access through the Project Area during the annual Pony Express re-ride, which generally occurs in June. This mitigation would allow for independent (non-NPEA) re-riders to follow the trail through the Project Area at other times of the year, subject to 30-day advance notice and certain safety restrictions, and subject to EML's approval, and to provide for an alternative route for trail riders during other times of the year, weather permitting.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this mitigation measure would effectively mitigate the impact for those times in June of each year when the re-ride occurs, as well as individual use at other times of the year. In addition, the mitigation would be effective by providing a continuous route, although not the designated route, year round. However, this mitigation has no effect on the closure of the designated route for most of the year.

3.20.3.3.3 Residual Adverse Impacts

The residual impact to the viewshed of the historic trail remains a significant effect and is an irretrievable and irreversible commitment of this resource. The potential residual impact to access to the historic trail is less than significant due to the mitigation. The overall impact to historic trail access is not irreversible or irretrievable.

3.20.3.4 No Action Alternative

3.20.3.4.1 Historic Trail Viewshed

As a result of implementation of the No Action Alternative, none of the impacts to the viewshed from the historic trail would occur. As a result, there would be no impacts.

3.20.3.4.2 Historic Trail Access

As a result of the implementation of the No Action Alternative there would be no impacts to historic trail access.

3.20.3.4.3 Residual Adverse Impacts

Under the No Action Alternative there would be no residual impacts.

3.20.3.5 Partial Backfill Alternative

3.20.3.5.1 Historic Trail Viewshed

Implementation of the Partial Backfill Alternative would result in potential visual impacts to the historic trail that are similar to, but proportionally less than those outlined under the Proposed Action. Even though the Non-PAG WRDF would be smaller, the PAG WRDF and the open pit high wall would remain visible and dominant features on the landscape.

- **Impact 3.20.3.5-1:** The Partial Backfill Alternative would permanently modify the viewshed from the historic trail within three miles of the centerline to a degree that is not consistent with the BLM VRM Class II threshold.

  Significance of the Impact: This potential impact to the historic trail is significant. **The following mitigation has been identified for this impact.**

- **Mitigation Measure 3.20.3.5-1: As part of the Historic Treatment Plan, EML for the historic trail would include photodocumentation to capture the setting and feel of the Pony Express Trail adjacent to the Project that would be visually impacted. The Treatment Plan would also include off-site mitigation in the form of GPS mapping and surveying of off-site portions of the Pony Express Trail located on public land. Segments would be selected at a one to one ratio of linear mileage based on the length of segments of the trail that would be impacted by the Project and are considered eligible as discussed in Section 3.21.3. Additionally, Mitigation Measure 3.7.3.3-1 would reduce visual impacts to users of the Pony Express Trail.**

- **Effectiveness of Mitigation and Residual Effects: The effectiveness of this mitigation in reducing the impact to less than significant is not likely; however, given the type and scale of the action this mitigation would be the most effective approach at limiting the impact. The mitigation is designed to document the user experience of those segments of the trail that would be impacted by the Project and enhance the understanding of unevaluated segments of the trail. Therefore, these measures and the ones identified in Mitigation Measure 3.7.3.3-1 would be effective at mitigating visual impacts to the Pony Express Trail.**

3.20.3.5.2 Historic Trail Access

Implementation of the Partial Backfill Alternative would result in similar impacts to historic trail access as those discussed under the Proposed Action.

- **Impact 3.20.3.5-2:** The Partial Backfill Alternative would eliminate access to that portion of the historic trail within the Project exclusion fence.

  Significance of the Impact: This potential impact to the historic trail access is significant.

- **Mitigation Measure 3.20.3.5-2:** EML would implement the mitigation plan included in Appendix **D, Attachment 1** to provide access through the Project Area during the annual Pony Express re-ride, which generally occurs in June. This mitigation would allow for independent (non-NPEA) re-riders to follow the trail through the Project Area at other times of the year, subject to 30-day advance notice and certain safety restrictions, and subject to EML's approval, and to provide for an alternative route for trail riders during other times of the year, weather permitting.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this mitigation measure would effectively mitigate the impact for those times in June of each year when the re-ride occurs, as well as individual use at other times of the year. In addition, the mitigation would be effective by providing a continuous route, although not the

designated route, year round. However, this mitigation has no effect on the closure of the designated route for most of the year.

3.20.3.5.3 Residual Adverse Impacts

The residual impact to the viewshed of the historic trail remains a significant effect and is an irretrievable and irreversible commitment of this resource. The potential residual impact to access to the historic trail is less than significant due to the mitigation. The overall impact to historic trail access is not irreversible or irretrievable.

3.20.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

3.20.3.6.1 Historic Trail Viewshed

Implementation of the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in potential impacts that are similar to those outlined under the Proposed Action.

- **Impact 3.20.3.6-1:** The Off-Site Transfer of Ore Concentrate for Processing Alternative would permanently modify the viewshed from the historic trail within three miles of the centerline to a degree that is not consistent with the BLM VRM Class II threshold.

  Significance of the Impact: This potential impact to the historic trail is significant. **The following mitigation has been identified for this impact.**

- **Mitigation Measure 3.20.3.6-1: As part of the Historic Treatment Plan, mitigation for the historic trail would include photodocumentation to capture the setting and feel of the Pony Express Trail adjacent to the Project that would be visually impacted. The Treatment Plan would also include off-site mitigation in the form of GPS mapping and surveying of off-site portions of the Pony Express Trail located on public land. Segments would be selected at a one to one ratio of linear mileage based on the length of segments of the trail that would be impacted by the Project and are considered eligible as discussed in Section 3.21.3. Additionally, Mitigation Measure 3.7.3.3-1 would reduce visual impacts to users of the Pony Express Trail.**

- **Effectiveness of Mitigation and Residual Effects: The effectiveness of this mitigation in reducing the impact to less than significant is not likely; however, given the type and scale of the action this mitigation would be the most effective approach at limiting the impact. The mitigation is designed to document the user experience of those segments of the trail that would be impacted by the Project and enhance the understanding of unevaluated segments of the trail. Therefore, these measures and the ones identified in Mitigation Measure 3.7.3.3-1 would be effective at mitigating visual impacts to the Pony Express Trail.**

3.20.3.6.2 Historic Trail Access

Implementation of the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in similar impacts to historic trail access as those discussed under the Proposed Action.

- **Impact 3.20.3.6-2:** The Off-Site Transfer of Ore Concentrate for Processing Alternative would eliminate access to that portion of the historic trail within the Project exclusion fence.

  Significance of the Impact: This potential impact to the historic trail access is significant.

- **Mitigation Measure 3.20.3.6-2:** EML would implement the mitigation plan included in Appendix **D, Attachment 1** to provide access through the Project Area during the annual Pony Express re-ride, which generally occurs in June. This mitigation would allow for independent (non-NPEA) re-riders to follow the trail through the Project Area at other times of the year, subject to 30-day advance notice and certain safety restrictions, and subject to EML's approval, and to provide for an alternative route for trail riders during other times of the year, weather permitting.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this mitigation measure would effectively mitigate the impact for those times in June of each year when the re-ride occurs, as well as individual use at other times of the year. In addition, the mitigation would be effective by providing a continuous route, although not the designated route, year round. However, this mitigation has no effect on the closure of the designated route for most of the year.

3.20.3.6.3 Residual Adverse Impacts

The residual impact to the viewshed of the historic trail remains a significant effect and is an irretrievable and irreversible commitment of this resource. The potential residual impact to access to the historic trail is less than significant due to the mitigation. The overall impact to historic trail access is not irreversible or irretrievable.

3.20.3.7 Slower, Longer Project Alternative

Impacts to historic trails from the Slower, Longer Project Alternative are expected to be similar to impacts from the Proposed Action; however, impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action.

3.20.3.7.1 Historic Trail Viewshed

- **Impact 3.20.3.7-1:** The Slower, Longer Project Alternative would permanently modify the viewshed from the historic trail within three miles of the centerline to a degree that is not consistent with the BLM VRM Class II threshold.

  Significance of the Impact: This potential impact to the historic trail is significant. **The following mitigation has been identified for this impact.**

- **Mitigation Measure 3.20.3.7-1: As part of the Historic Treatment Plan, mitigation for the historic trail would include photodocumentation to capture the setting and feel of the Pony Express Trail adjacent to the Project that would be visually impacted. The Treatment Plan would also include off-site mitigation in the form of**

GPS mapping and surveying of off-site portions of the Pony Express Trail located on public land. Segments would be selected at a one to one ratio of linear mileage based on the length of segments of the trail that would be impacted by the Project and are considered eligible as discussed in Section 3.21.3. Additionally, Mitigation Measure 3.7.3.3-1 would reduce visual impacts to users of the Pony Express Trail.

- **Effectiveness of Mitigation and Residual Effects: The effectiveness of this mitigation in reducing the impact to less than significant is not likely; however, given the type and scale of the action this mitigation would be the most effective approach at limiting the impact. The mitigation is designed to document the user experience of those segments of the trail that would be impacted by the Project and enhance the understanding of unevaluated segments of the trail. Therefore, these measures and the ones identified in Mitigation Measure 3.7.3.3-1 would be effective at mitigating visual impacts to the Pony Express Trail.**

3.20.3.7.2 Historic Trail Access

- **Impact 3.20.3.7-2:** The Slower, Longer Project Alternative would eliminate access to that portion of the historic trail within the Project exclusion fence.

  Significance of the Impact: This potential impact to the historic trail access is significant.

- **Mitigation Measure 3.20.3.7-2:** EML would implement the mitigation plan included in Appendix **D, Attachment 1** to provide access through the Project Area during the annual Pony Express re-ride, which generally occurs in June. This mitigation would allow for independent (non-NPEA) re-riders to follow the trail through the Project Area at other times of the year, subject to 30-day advance notice and certain safety restrictions, and subject to EML's approval, and to provide for an alternative route for trail riders during other times of the year, weather permitting.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this mitigation measure would effectively mitigate the impact for those times in June of each year when the re-ride occurs, as well as individual use at other times of the year. In addition, the mitigation would be effective by providing a continuous route, although not the designated route, year round. However, this mitigation has no effect on the closure of the designated route for most of the year.

3.20.3.7.3 Residual Adverse Impacts

The residual impact to the viewshed of the historic trail remains a significant effect and is an irretrievable and irreversible commitment of this resource. The potential residual impact to access to the historic trail is less than significant due to the mitigation. The overall impact to historic trail access is not irreversible or irretrievable.

3.21 Cultural Resources

3.21.1 Regulatory Framework

Section 106 of the NHPA and its implementing regulations under 36 CFR 800 require all federal agencies to consider effects of federal actions on cultural resources eligible for or listed in the NRHP. Other laws related to the NHPA with which agencies must comply include, but are not limited to, the following:

- AHPA;
- ARPA;
- American Indian Religious Freedom Act of 1978 (AIRFA); and
- Native American Graves Protection and Repatriation Act of 1990 (NAGPRA).

Properties of cultural or religious importance (PCRIs) are protected under the AIRFA, and NAGPRA. A PCRI may be eligible for listing in the NRHP because of its association with cultural practices or beliefs of a living community that are: (a) rooted in the history of the community or tribe; and, (b) important in maintaining the continuing cultural identity of the community or tribe. Consultation with tribes regarding PCRIs can be found in the Native American Traditional Values Section (Section 3.22).

3.21.2 Affected Environment

3.21.2.1 Area of Potential Effect

The NHPA and 36 CFR Part 800 requires the BLM to consider effects to historic properties within the Area of Potential Effect (APE). The APE for historic properties is defined in 36 CFR 800.9(a) as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The **APE** is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking." The Project APE or area of possible direct and indirect impacts for historic properties was defined by the BLM to include the areas of the undertakings for exploration and development projects subject to surface disturbance as shown on Figure 2.1.7. Mine development activities for each of the alternatives include areas that would be directly and indirectly affected (i.e., the footprint of the mine facilities, pipelines, access roads, rerouted transmission lines, staging areas, borrow areas, and other facilities). The BLM also determined that there would be an area of indirect visual impacts, viewshed APE, for eligible historic properties or unevaluated historic resources where the Project would be visible within a 20-mile radius of the top of Mount Hope, in which the indirect impacts would adversely affect the integrity of setting for these sites. A file search was conducted of the known sites within this viewshed on December 24, 2008. Historic properties and unevaluated historic resources that are present within the viewshed APE were determined by using a DEM to create a three-dimensional representation of the terrain surrounding Mount Hope. Using the DEM in conjunction with the file search results, the sites (i.e., a total of 436) that could be seen from the highest point of Mount Hope within a 20-mile radius were identified. The Project APE (area of direct and indirect effects) lies within this viewshed APE and is defined as the Project Area. The Project APE was completely surveyed to a Class III (considered100 percent inventory) level. In preparation for the survey of the Project Area, a file search was conducted of the Project APE and a one-mile buffer surrounding it (Malinky et al. 2008). The APE for Native American

Traditional Values is defined separately from the Project APE and viewshed APEs for historic properties and can be found in Section 3.22.

In addition, a PA was completed between the BLM and the Nevada SHPO to address potential adverse effects to eligible or unevaluated cultural sites and specifies the following: measures to be taken with regard to the identification and evaluation of historic properties; Native American consultation; resolutions of eligibility; development of treatment plans; measures to cover discovery situations; report and monitoring requirements; Notices to Proceed; time frames for inventory, consultation, report completion; curation; measures for posting surety bonds; protocols for dispute resolution; and procedures for amending, terminating, and execution of the PA. A copy of the PA is available for review at the MLFO during normal business hours. The following Native American tribes were invited to be concurring parties for the PA: the Te-Moak Tribe of the Western Shoshone, the Yomba Shoshone Tribe, the Duckwater Shoshone Tribe, the Ely Shoshone Tribe, and the Timbisha Shoshone Tribe. Although these tribes have indicated that they would not participate as concurring parties to the PA, ongoing consultation between the BLM and the Tribes is in progress (see Section 3.22).

3.21.2.2 Data Sources

Archival research of the Project APE and a one-mile buffer surrounding the APE was conducted at the Special Collections Library at the UNR, the Mackay School of Mines at the UNR, the Nevada Bureau of Mines and Geology, the BLM BMDO, and the Nevada Census Records to determine the presence of previously recorded or documented cultural resources. File searches were also conducted through the Nevada Cultural Resources Information System, the Nevada State Register, and the NRHP. Native American consultation efforts by the BLM for the Project are discussed under Native American Traditional Values (see Section 3.22).

Potential historic properties may include districts, sites, buildings, structures, and objects that possess historical integrity and are greater than 50 years old. Cultural resource types found within the Project APE for all mining study areas include prehistoric and historic archaeological sites. Examples of prehistoric sites include camps, lithic scatters, ceramic scatters, stone circles, quarries, hunting sites and blinds, among others. Examples of historic sites include roads, trails, railroads, mining sites, ranches, quarries, charcoal manufacturing camps, charcoal piles, buildings, structures, and features, among others.

The current NRHP status of previously recorded resources within the Project APE was noted, and resources recorded as a result of the Class III survey were fully documented and NRHP significance evaluated (Bengston 2007; Malinky 2006; 2008a-b; 2009a-e; 2010; Malinky et al. 2008). Evaluation of cultural resources is codified under 36 CFR 60.4 and summarized below (NRHP, National Register Bulletin, revised 1998):

> The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
> b) that are associated with the lives of persons significant in the past; or

c) that embody the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possess high artistic value, or that represent a significant or distinguishable entity whose components may lack individual distinction; or

d) that have yielded, or are likely to yield, information important in prehistory or history.

Properties listed in or eligible for listing in the NRHP must be important in American history, architecture, archaeology, engineering, or culture. In addition, to be significant, a property must also have physical integrity to be listed in or be eligible for listing in the NRHP. In some cases, additional information must be gathered to evaluate a cultural resource with regard to the NRHP criteria. This information may be gathered by means of limited excavation or testing to determine the presence and extent of significant buried cultural material or, in the case of historic sites, archival research to better evaluate these sites under criteria a-c, as summarized above. Cultural resource sites recommended not eligible for the NRHP either do not meet any of the criteria outlined under 36 CFR 60.4 or lack physical integrity (i.e., have been significantly altered or destroyed by previous human activity or natural processes). Sites with field evaluations (i.e., field eligible, field not eligible, field needs data), those that have not been assessed with regard to NRHP eligibility, or those that cannot be relocated by means of file search data alone are considered unevaluated for inclusion in the NRHP.

3.21.2.3 Cultural History Overview

Consideration must be given to the human uses and occupation of the Project Area for the past 10,000 years to adequately summarize the cultural history of the Project APE. A concise summary of the history is provided in the following paragraphs. The information is presented in chronological stages, defined by anthropologists as changes in subsistence strategies (i.e., the techniques that societies use to transform natural resources into food, clothing, and shelter) and material cultural (i.e., the items manufactured by societies and the meanings cultures give to those items). The cultural history overview is summarized from the studies prepared for the Project (Bengston 2007; Malinky 2008a-e; 2010; Malinky et al. 2008).

Archaeologists working in the Great Basin have found evidence of human use of the region for more than 10,000 years. While they generally agree on the earlier dates, the experts often use different labels for the stages and there is some debate over end dates for the stages. This overview is based on the work of Malinky and others, and their chronological scheme has been adopted here. These experts note that the earliest human occupations occurred during the Pre-Archaic stage, the period prior to approximately 8,000 years before present (B.P.). These people hunted now extinct large animals and some smaller animals as well as gathered and processed plants found near lakes and marshes. The hunters used large projectile points, including some distinctive concave-base and stemmed points. Diffuse lithic scatters, some with tools, dominate the sites attributed to the Pre-Archaic. A small number of quarries and workshops also have been recorded. The Pre-Archaic sites are usually found in association with the shores of extinct lakes or near important permanent water resources.

The Archaic Stage lasted from approximately 8,000 years B.P. to the historic period 150 to 200 years B.P. in the Great Basin. Archaeologists further divide the Archaic into three periods beginning with the Early Archaic period (8,000 years B.P. to 4,000 years B.P.). Evidence from these sites indicates that people lived in small groups, occupied shelters, and hunted a range of

animals with atlatl and dart points instead of the larger stemmed and Clovis points of earlier times. Sites associated with the Early Archaic tend to be camps, hunting sites, and limited-activity lithic scatters. Within the Great Basin, the second period of the Archaic Stage, the Middle Archaic, dates from 4,000 years B.P. to 1,500 years B.P. Archaeologists have investigated numerous sites across the central Great Basin that date to this period. People of this period continued use of the atlatl and dart for hunting but came to rely more on seed processing for food. Evidence of regional trade networks for obsidian and marine shell beads has been found at various sites. Sites commonly associated with the Middle Archaic period include hunting sites, camp sites, quarries, and lithic scatters. The Late Archaic (1,500 years B.P. to 150 to 200 years B.P), also known as the Fremont Culture (1,500 years B.P. to 700 years B.P.), ends soon after the initial Euro-American intrusions into the region. The bow and arrow replaced the atlatl and dart technology for hunting. This indicates a likelihood that the hunters sought a variety of smaller game like cottontail rabbits, woodchucks, and chipmunks instead of the big horn sheep, deer, and antelope that had been the dominate species hunted earlier.

Migrations also took place, most notably the arrival of the Western Shoshone in the central Great Basin by 700 years B.P. following the disappearance of the Fremont Culture. The Western Shoshone lived in small extended family groups, made and used brownware ceramics, and gathered pine nuts. They were also highly mobile and held large seasonal gatherings for pine nut harvests and antelope drives. The end of the Late Archaic is also marked by the arrival of Euro-Americans, first as explorers during the 1820s, then as settlers and colonizers of the land by the 1860s. Bengston (2007) identified three periods of contact between the Western Shoshone and Euro-Americans: 1) Contact and Exploration (1826 to 1862); 2) Euro-American Settlement (1862 to 1930); and 3) Contemporary Times (1930 to the present). Native American culture experienced tremendous change during the era, and by the 1930s little remained of their original lifeways. Sites tended to be of similar types into the later years when Euro-American influences began to manifest themselves in the archaeological record.

Five themes related to the Euro-American history of the Mount Hope region have been identified (Malinky et al. 2008) and include: 1) exploration and emigration; 2) transportation and communication; 3) mining and industry; 4) ranching and agriculture; and 5) the role of ethnic populations in the region's development. The exploration period begins during the 1820s when parties of trappers from the Hudson's Bay Company visited Nevada, trapping the Humboldt River and its tributaries between 1826 and 1828. These explorers established the Humboldt River as a primary route through central Nevada that remained popular into the late 19th century. The river route proved to be a satisfactory route to California after the Mexican War and the discovery of **Au** in California (1848). Typically the resources associated with the explorers are small campsites, often not discernible from others or initials and other engravings on rocks and similar small sites.

The Mount Hope area served as part of an important transportation and communication area from the early 1850s into the 1930s. Malinky et al. (2008) identified three significant historic transportation routes that passed through the Project Area: 1) the Pony Express/Overland Stage and Mail Route; 2) the Garden Pass Road; and 3) the Eureka and Palisades Railroad. Transportation-related sites typically are linear or remnants of linear sites or facilities such as stage station ruins.

The third theme, mining and industry, perhaps had the greatest nineteenth century influences on the Project Area and region. Mining on Mount Hope began in 1886 and has continued

sporadically into modern times. The mines have produced Au, Ag, Cu, Pb, and Zn as well as other minerals. Some evidence indicates that a pioneer mining district, the McGeary (aka McGarry) mining district, may have been located within the Project Area but this has not been confirmed. Evidence of mining resources includes small campsites and prospect pits to the ruins of larger, industrial scale mines and mills. Charcoal production evolved as a support industry for the smelters that developed charcoal to refine the ores of Eureka's mines during the 1870s. Italian and Swiss charcoal makers, often referred to as Carbonari, built charcoal ovens and harvested wood throughout the Project Area during the late nineteenth century leaving behind a distinctive archaeological record.

Ranching and agriculture developed to support first the Pony Express and Overland Stage operations and later the miners in Eureka as well as other districts. Evidence of ranching and agricultural activities are generally present in the form of active ranches, line shacks, or the campsites associated with roundups as well as other site types.

The final theme, ethnicity, is an underlying theme that encompasses mining, the charcoal industry, agriculture, and the many other, lesser historic period activities of the region. Often the sites do have unique ethnic markers in the artifact assemblages such as Asian ceramics or opium tins.

3.21.2.4 Existing Conditions

Cultural resource investigations of the Project APE resulted in the documentation of 594 sites of which one previously recorded site has not been assessed (26EU4556). In some cases, the location of previously recorded sites is unclear. It is presumed that these resources may have been destroyed (Malinky 2008a). The BLM submitted nine reports (Malinky 2008a-e; 2010; Malinky et al. 2008) that provided NRHP determinations of eligibility for 594 sites to the Nevada SHPO for concurrence.

Of the 594 sites documented within the Project APE, a total of 242 sites are located within the area of direct impacts (i.e., the Project footprint). Of this number, 83 sites have been officially determined eligible and 159 have been officially determined not eligible. Site types include 80 prehistoric, 142 historic, and 20 multi-component. A total of 352 sites are located outside of the area of direct effects but still within the Project APE. Of these sites, 180 have been officially determined eligible, 171 have been officially determined not eligible, and one is unevaluated. Site types include 111 prehistoric, 37 multi-component, and two with unknown affiliation. Site types within the Project APE are enumerated in Table 3.21-1.

3.21.3 Environmental Consequences and Mitigation Measures

3.21.3.1 Significance Criteria

The significance criterion used to evaluate the impacts of the Proposed Action and proposed alternatives on cultural resources is whether or not any action would adversely affect historic properties eligible for inclusion in the NRHP.

Table 3.21-1: Cultural Resource Sites within the Project Area of Potential Effect

Site Type	Officially Determined Eligible	Officially Determined Not Eligible	Not Assessed	Site Type Totals
Sites within Area of Direct Impacts				
Prehistoric	24	56	0	80
Historic*	45	97	0	142
Multi-Component*	14	6	0	20
Totals	83	159	0	242
Sites within Area of Indirect Impacts				
Prehistoric	48	62	1	111
Historic*	107	95	0	202
Multi-Component*	25	12	0	37
Unknown	0	2	0	2
Totals	180	171	1	352

*The historic sites and multi-component sites with a historic element within the Project APE are also within the viewshed APE; prehistoric sites are not considered in the viewshed APE.

NRHP eligibility of cultural resources is determined by applying the criteria specified in 36 CFR 60.4 (see Data Sources Section above). In addition to having eligibility related to one of the four criteria, a cultural resource must also retain sufficient physical integrity to convey their importance to present observers. The National Register has defined seven elements of integrity that are: 1) location; 2) design; 3) setting; 4) materials; 5) workmanship; 6) feeling; and 7) association.

For the Project, these general criteria were further refined into research themes for prehistoric and historic period sites. Five research themes (Malinky et al. 2008) were defined for the prehistoric period including: 1) chronology; 2) settlement and subsistence; 3) trade and exchange; 4) lithic technology; and 5) Native Americans in the "Ethnographic Present". For the historic period, an additional five themes were developed and include: 1) exploration and emigration; 2) transportation and communication; 3) mining and industry; 4) ranching and agriculture; and 5) ethnicity. Research questions and associated resource types relevant to each of the themes were also applied to the data. For a resource to be considered eligible for inclusion in the NRHP it had to be related to one of the themes and offer data to address the questions associated with the research themes.

3.21.3.2 Assessment Methodology

Impacts to cultural resources were assessed in light of the degree the Project may adversely affect cultural resources listed in the NRHP, eligible for listing in the NRHP, or unevaluated for the NRHP and, therefore, potentially eligible for listing in it. As per 36 CFR 800.16(i), a property would be affected if the Project would alter its NRHP qualifying characteristics. For this reason, it is necessary to know why the property is significant and what elements of the property contribute to that significance. Significant impacts to historic properties are irreversible. There would be direct impacts to resources located in the Project footprint and indirect impacts to those resources located outside of this area but within the Project APE.

3.21.3.3 Proposed Action

Construction of the mine and associated facilities have the potential to adversely affect cultural resources and would result in direct, indirect, and cumulative effects. As stated previously, there are 594 known sites within the Project APE. A total of 264 NRHP eligible or unevaluated sites (73 prehistoric, 152 historic, 39 multi-component) were identified within the Project APE (Bengston 2007; Malinky 2008a-b, 2009a-e, 2010; Malinky et al. 2008). The prehistoric sites (191) and multi-component sites with prehistoric elements (57) (see Table 3.21-1) within the Project APE range from large complex surface and subsurface assemblages, including: debitage; ground stone; lithic tools; diagnostic projectile points; stone features; prehistoric Shoshone Brownware ceramics; an extensive lithic scatter with a quarry; smaller campsites; lithic scatters with ground stone; and simple lithic scatters. The historic sites (344) and the multi-component sites with historic elements (57) (see Table 3.21-1) within the Project APE range from large and small mining sites, sites related to major transportation routes (Overland Road/Pony Express Trail and the Eureka & Palisades Railroad), a Chinese railroad construction site, Carbonari charcoal manufacturing areas including a charcoal ranch, a ranching complex, lesser transportation routes (roads), and historic refuse scatters. Two sites consist of stone features of unknown age. A total of 242 sites were located within the area of direct impacts (i.e., the Project footprint), and 83 sites have officially been determined eligible.

- **Impact 3.21.3.3-1:** Implementation of the Proposed Action would result in adverse effects to 83 officially eligible sites within the area of direct impacts. Outside of this area but within the Project APE, this action would also have indirect impacts on 180 officially eligible and one unevaluated site.

  Significance of the Impact: These direct impacts are considered to be significant. However, indirect impacts to eligible and unevaluated cultural resources within the Project APE are not considered to be significant at this time.

- **Mitigation Measure 3.21.3.3-1:** EML would develop, and submit to the BLM for approval, a treatment plan to address the potential direct impacts to the 83 officially eligible sites within the Project APE. EML would implement the treatment plan prior to any surface disturbance of eligible sites within the area of direct impacts. All adverse effects under the NHPA and direct and indirect impacts under the NEPA to known-eligible properties indentified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. No residual adverse effects are anticipated, as all known-eligible sites would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA.

  Effectiveness of Mitigation and Residual Effects: The implementation of the treatment plan under the mitigation measure would be effective at lessening the impact.

- **Impact 3.21.3.3-2:** Within the viewshed APE, 436 eligible and unevaluated historic and multi-component sites with a historic component would be indirectly impacted by reducing each site's integrity of setting as a result of the Proposed Action.

Significance of the Impact: Within the viewshed APE, eligible and unevaluated cultural resources would be indirectly affected by the Project and have also been previously impacted by past and present actions. The indirect impacts to eligible and unevaluated cultural resources within the viewshed APE **(outside the Project Area)** are not considered to be significant at this time.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Due to the area's extensive historic mining, ranching, and prehistoric/historic Native American habitation, there is a possibility for any surface disturbing activity to expose both nonnative and native gravesites.

- **Impact 3.21.3.3-3:** As a result of the Proposed Action, there could be an impact to Native American remains or artifacts.

  Significance of the Impact: This impact would be considered potentially significant; however, the impact would become less than significant after implementation of the mitigation measure described below.

- **Mitigation Measure 3.21.3.3-3:** In the case of inadvertent discovery of human remains, the BMDO Policy for the Discovery of Human Remains (**IM** NV-2010-001) – notification procedures - would be followed. If the remains are determined to be native, NAGPRA inadvertent discovery procedures would be adhered to. Under the NAGPRA, section (3)(d)(1), it states that the discovering individual must notify the land manager in writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation. Tribes, tribal organizations, possible lineal descendants, and individuals would then be contacted to determine cultural affiliation and subsequent transfer of custody procedures would begin.

  Effectiveness of Mitigation and Residual Effects: The Project could result in the exposure of Native American remains or artifacts. Implementation of Mitigation Measure 3.21.3.3-3 would prevent any impacts to these discoveries.

3.21.3.3.1 Residual Adverse Impacts

The Proposed Action would result in a potential impact that would be significant. The implementation of the mitigation measures would allow for the scientific collection of data these sites may yield; however, the potential impact would remain an irreversible and irretrievable commitment of cultural resources.

3.21.3.4 No Action Alternative

The No Action Alternative would allow the proponent to continue exploration activities under the existing Notices (NVN-080914, NVN-081485, NVN-081811, NVN-083120, NVN-083245, NVN-083246**, and NVN-090831**). The activities include mineral exploration, condemnation drilling, water quality monitoring well construction, hydrogeochemical, geotechnical data collection regarding areas under possible WRDFs and TSFs, and exploration for water supplies

outside the currently proposed Project boundaries. These activities would be located within the footprint of the Proposed Action; however, all activities under the Notices would be required to avoid cultural resources. Therefore, the No Action Alternative would have no impacts to cultural resources.

3.21.3.4.1 Residual Adverse Impacts

The No Action Alternative would not result in any irreversible or irretrievable commitment of cultural resources.

3.21.3.5 Partial Backfill Alternative

The Partial Backfill Alternative would have the same surface disturbance footprint as the Proposed Action Alternative; therefore, the same number of NRHP eligible and unevaluated sites would be impacted as noted above for the Proposed Action Alternative.

- **Impact 3.21.3.5-1:** Implementation of the Partial Backfill Alternative would result in adverse effects to 83 officially eligible sites within the area of direct impacts. Outside of this area but within the Project APE, this action would also have indirect impacts to 180 officially eligible and one unevaluated site.

  Significance of the Impact: These direct impacts are considered to be significant. However, indirect impacts to eligible and unevaluated cultural resources within the Project APE are not considered to be significant at this time.

- **Mitigation Measure 3.21.3.5-1:** EML would develop, and submit to the BLM for approval, a treatment plan to address the potential impacts to the 83 officially eligible sites within the Project APE. EML would implement the treatment plan prior to any surface disturbance of eligible sites within the area of direct impacts. All adverse effects under the NHPA and direct and indirect impacts under NEPA to known-eligible properties identified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. No residual adverse effects are anticipated, as all known-eligible sites would be mitigated in accordance with the PA and the treatment plan prepared for the Project.

- **Effectiveness of Mitigation and Residual Effects:** The implementation of the treatment plan under the mitigation measure would be effective at lessening the impact.

- **Impact 3.21.3.5-2:** Within the viewshed APE, 436 eligible and unevaluated historic and multi-component sites with a historic component would be indirectly impacted by reducing each site's integrity of setting as a result of the Proposed Action.

  Significance of the Impact: Within the viewshed APE, eligible and unevaluated cultural resources would be indirectly affected by the Project and have been previously impacted by past and present actions. The indirect impacts to eligible and unevaluated cultural resources within the viewshed APE **(outside the Project Area)** are not considered to be significant at this time.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Due to the area's extensive historic mining, ranching, and prehistoric/historic Native American habitation, there is a possibility for any surface disturbing activity to expose both nonnative and native gravesites.

- **Impact 3.21.3.5-3:** As a result of the Proposed Action, there could be an impact to Native American remains or artifacts.

  Significance of the Impact: This impact would be considered potentially significant; however, the impact would become less than significant after implementation of the mitigation measure described below.

- **Mitigation Measure 3.21.3.5-3:** In the case of inadvertent discovery of human remains, the BMDO Policy for the Discovery of Human Remains (**IM** NV-2010-001) – notification procedures - would be followed. If the remains are determined to be native, NAGPRA inadvertent discovery procedures would be adhered to. Under the NAGPRA, section (3)(d)(1), it states that the discovering individual must notify the land manager in writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation. Tribes, tribal organizations, possible lineal descendants, and individuals would then be contacted to determine cultural affiliation and subsequent transfer of custody procedures would begin.

  Effectiveness of Mitigation and Residual Effects: The Project could result in the exposure of Native American remains or artifacts. Implementation of Mitigation Measure 3.21.3.5-3 would prevent any impacts to these discoveries.

3.21.3.5.1 Residual Adverse Impacts

The Partial Backfill Alternative would result in a potential impact that would be significant. The implementation of the mitigation measures would allow for the scientific collection of data these sites may yield; however, the potential impact would remain an irreversible and irretrievable commitment of cultural resources.

3.21.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

The surface disturbance footprint for the Off-Site Transfer of Ore Concentrate for Processing Alternative is approximately 20 acres less than under the Proposed Action Alternative due to the placement of a processing facility elsewhere; however, the same number of NRHP eligible and unevaluated sites would be impacted as noted above for the Proposed Action Alternative.

- **Impact 3.21.3.6-1:** Implementation of the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in adverse effects to 83 officially eligible sites within the area of direct impacts. Outside of this area but within the Project APE, this action would also have indirect impacts on 180 officially eligible and one unevaluated site.

Significance of the Impact: These impacts are considered to be significant. However, indirect impacts to eligible and unevaluated cultural resources within the Project APE are not considered to be significant at this time.

- **Mitigation Measure 3.21.3.6-1:** EML would develop, and submit to the BLM for approval, a treatment plan to address the potential impacts to the 83 officially eligible sites within the Project APE. EML would implement the treatment plan prior to any surface disturbance of eligible sites within the area of direct impacts. This mitigation would be effective at reducing the impacts to cultural resources. All adverse effects under the NHPA and direct and indirect impacts under NEPA to known-eligible properties identified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. No residual adverse effects are anticipated, as all known-eligible sites would be mitigated in accordance with the PA and the treatment plan prepared for the Project.

- **Effectiveness of Mitigation and Residual Effects:** The implementation of the treatment plan under the mitigation measure would be effective at lessening the impact.

- **Impact 3.21.3.6-2:** Within the viewshed APE, 436 eligible and unevaluated historic and multi-component sites with a historic component would be indirectly impacted by reducing each site's integrity of setting as a result of the Proposed Action.

  Significance of the Impact: Within the viewshed APE, eligible and unevaluated cultural resources would be indirectly affected by the Project and have been previously impacted by past and present actions. The indirect impacts to eligible and unevaluated cultural resources within the viewshed APE **(outside the Project Area)** are not considered to be significant at this time.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Due to the area's extensive historic mining, ranching, and prehistoric/historic Native American habitation, there is a possibility for any surface disturbing activity to expose both nonnative and native gravesites.

- **Impact 3.21.3.6-3:** As a result of the Proposed Action, there could be an impact to Native American remains or artifacts.

  Significance of the Impact: This impact would be considered potentially significant; however, the impact would become less than significant after implementation of the mitigation measure described below.

- **Mitigation Measure 3.21.3.6-3:** In the case of inadvertent discovery of human remains, the BMDO Policy for the Discovery of Human Remains (**IM** NV-2010-001) – notification procedures - would be followed. If the remains are determined to be native, NAGPRA inadvertent discovery procedures would be adhered to. Under the NAGPRA, section (3)(d)(1), it states that the discovering individual must notify the land manager in writing of such a discovery. If the discovery occurs in connection with an authorized use,

the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation. Tribes, tribal organizations, possible lineal descendants, and individuals would then be contacted to determine cultural affiliation and subsequent transfer of custody procedures would begin.

Effectiveness of Mitigation and Residual Effects: The Project could result in the exposure of Native American remains or artifacts. Implementation of Mitigation Measure 3.21.3.6-3 would prevent any impacts to these discoveries.

3.21.3.6.1 Residual Adverse Impacts

The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in a potential impact that would be significant. The implementation of the mitigation measures would allow for the scientific collection of data these sites may yield; however, the potential impact would remain an irreversible and irretrievable commitment of cultural resources.

3.21.3.7 Slower, Longer Project Alternative

Impacts to cultural resources from the Slower, Longer Project Alternative are expected to be similar to impacts from the Proposed Action.

- **Impact 3.21.3.7-1:** Implementation of the Slower, Longer Project Alternative would result in adverse effects to 83 officially eligible sites within the area of direct impacts. Outside of this area but within the Project APE, this action would also have indirect impacts on 180 officially eligible and one unevaluated site.

  Significance of the Impact: These impacts are considered to be significant. However, indirect impacts to eligible and unevaluated cultural resources within the Project APE are not considered to be significant at this time.

- **Mitigation Measure 3.21.3.7-1:** EML would develop, and submit to the BLM for approval, a treatment plan to address the potential impacts to the 83 officially eligible sites within the Project APE. EML would implement the treatment plan prior to any surface disturbance of eligible sites within the area of direct impacts. This mitigation would be effective at reducing the impacts to cultural resources. All adverse effects under the NHPA and direct and indirect impacts under NEPA to known-eligible properties identified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. Therefore, no mitigation or monitoring is proposed. No residual adverse effects are anticipated, as all known-eligible sites would be mitigated in accordance with the PA and the treatment plan prepared for the Project.

- **Effectiveness of Mitigation and Residual Effects:** The implementation of the treatment plan under the mitigation measure would be effective at lessening the impact.

- **Impact 3.21.3.7-2:** Within the viewshed APE, 436 eligible and unevaluated historic and multi-component sites with a historic component would be indirectly impacted by reducing each site's integrity of setting as a result of the Proposed Action.

Significance of the Impact: Within the viewshed APE, eligible and unevaluated cultural resources would be indirectly affected by the Project and have been previously impacted by past and present actions. The indirect impacts to eligible and unevaluated cultural resources within the viewshed APE **(outside the Project Area)** are not considered to be significant at this time.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Due to the area's extensive historic mining, ranching, and prehistoric/historic Native American habitation, there is a possibility for any surface disturbing activity to expose both nonnative and native gravesites.

- **Impact 3.21.3.7-3:** As a result of the Proposed Action, there could be an impact to Native American remains or artifacts.

  Significance of the Impact: This impact would be considered potentially significant; however, the impact would become less than significant after implementation of the mitigation measure described below.

- **Mitigation Measure 3.21.3.7-3:** In the case of inadvertent discovery of human remains, the BMDO Policy for the Discovery of Human Remains (**IM** NV-2010-001) – notification procedures - would be followed. If the remains are determined to be native, NAGPRA inadvertent discovery procedures would be adhered to. Under the NAGPRA, section (3)(d)(1), it states that the discovering individual must notify the land manager in writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation. Tribes, tribal organizations, possible lineal descendants, and individuals would then be contacted to determine cultural affiliation and subsequent transfer of custody procedures would begin.

  Effectiveness of Mitigation and Residual Effects: The Project could result in the exposure of Native American remains or artifacts. Implementation of Mitigation Measure 3.21.3.7-3 would prevent any impacts to these discoveries.

3.21.3.7.1 Residual Adverse Impacts

The Slower, Longer Project Alternative would result in a potential impact that would be significant. The implementation of the mitigation measures would allow for the scientific collection of data these sites may yield; however, the potential impact would remain an irreversible and irretrievable commitment of cultural resources.

3.22 Native American Traditional Values

3.22.1 Regulatory Framework

In accordance with the NHPA (P.L. 89-665), the NEPA (P.L. 91-190), the FLPMA (P. L.94-579), the AIRFA (P.L. 95-341), the NAGPRA (P.L. 101-601), ARPA (P.L. 96-95), Executive Order 13007 (Indian Sacred Sites, 1996), Executive Order 13175 (Consultation and Coordination

With Indian Tribal Governments, 2000), **and the Department of the Interior Policy on Consultation with Indian Tribes (IM 2012-062), and** the BLM must provide affected Tribes, organizations, and/or individuals an opportunity to participate in, comment, and consult on proposed actions that might impact resources, sites, or activities of concern. Through consultation initiation with area tribes, BLM must attempt to identify specific traditional/cultural/spiritual sites, activities, and resources and limit, reduce, or possibly eliminate any negative impacts. BLM also utilizes H-8120-1 General Procedural Guidance for Native American Consultation and National Register Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties (TCPs).

The NEPA requires the preparation of applicable environmental analysis (EA, EIS) for major federal land management actions that may significantly impact the quality of the human environment. CEQ regulations and guidance, specific to NEPA, require agencies to contact Indian Tribes and provide participation/comment opportunities for planning and decision making purposes. Section 40 CFR 1501.2(d)(2) states that Federal agencies must consult with tribes early in the NEPA process.

Consultation efforts with tribes under the auspices of NHPA seek to identify and evaluate these types of historic properties that contain traditional religious and cultural importance to their communities. In 1990, the NPS commissioned a publication to assist federal agencies in evaluating these types of historic properties for inclusion in the National Register. The ensuing National Register Bulletin 15 described these types of properties as TCPs, terms that are commonly used to categorize these historic properties.

By definition, a TCP is "one that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that are (a) rooted in that community's history, and are (b) important in maintaining the continuing cultural identity of the community" (Parker and King 1998). TCP types can be, but are not limited to, ceremonial sites, habitation sites, traditional origin locations, resource collection areas for subsistence or ceremonial use (includes mineral, plant, and water sources), burial sites, trails, and ethnohistorical locations. To qualify for nomination to the National Register as a Historic Property, a TCP must be more than 50 years old, must be a place with definable boundaries, must retain integrity (condition, relationship to culture group), and must meet certain criteria as outlined in National Register Bulletin 15 (NPS 1990). Consultation with tribes should be conducted by federal agencies when identification, evaluation, and management of TCPs are being considered.

Under the FLPMA, tribal governments are provided the opportunity to comment on BLM land use plans to ensure consistency between the BLM's and the tribe's land use plans. FLPMA requires the BLM to consult with interested publics, including Indian Tribes, when writing land use plans. When tribal land/resource management plans/policies exist, the BLM would coordinate planning with these existing plans/policies. FLPMA sets policy to protect historic and archaeological sites. Federal land managers may have sufficient authority under FLPMA to issue a tribe a Special Use Permit to accommodate undisturbed ceremonial use for a certain amount of time.

AIRFA was passed in 1978 to establish a policy of Federal protection for traditional Native American religious freedoms and **the inherent right of freedom to believe, express, and exercise their traditional religions, including but not limited to access to religious sites, use and possession of sacred objects, and freedom to worship through ceremonials and**

traditional rights. The AIRFA requires that (1) the views of Indian leaders be obtained and considered when a proposed land use might conflict with traditional Indian religious beliefs or practices, and that (2) unnecessary interference with Indian religious practices be avoided during project implementation, but specifying that (3) conflict need not necessarily bar Federal agencies from adopting proposed land uses in the public interest. This is the only law that specifically requires consultation with the practitioner of the native religion, not political leaders or academicians.

NAGPRA requires consultation between federal agencies and tribal governments, traditional leaders, and lineal descendants to determine affiliation and disposition of the specific kinds of "cultural items" defined in the Act, which include Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony. NAGPRA also provides provisions for inadvertent discoveries. The agency must consult with any affected tribe before issuing a permit to excavate or remove remains and associated funerary objects from public land.

ARPA established a permitting process prior to the intentional disturbance of traditional/cultural resource sites (testing and data recovery) on federal lands and requires notification of the appropriate tribes prior to approving a cultural resource use permit for excavation. Notification is contingent on a determination by the responsible federal land manager that a location of cultural or religious importance to the tribe may be harmed or destroyed as a result of excavation procedures.

EO 13007 (Indian Sacred Sites) obligates federal land managing agencies to work with Indian Tribes to help protect their basic rights to practice their religions at specific sites. If an agency is made aware of specific sites and associated activities well before the implementation of land uses, the BLM generally has the ability to accommodate tribal access to sacred sites and prevent physical damage. The major purpose of the EO is to improve communication between land managing agencies and tribes. The EO requires that sacred sites, any specific, discrete, narrowly delineated location on federal land, must be identified as such either by an Indian Tribe or by an Indian individual whom the tribe has named as the appropriately authorized representative of its religion. As stated in the EO, effects to the physical integrity of sacred sites are to be avoided "to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions."

EO 13175 was issued to "establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, to strengthen the U.S. government-to-government relationships with tribes, and to reduce the imposition of unfunded mandates upon Indian Tribes…" EO 13175 directs federal agencies to coordinate and consult with Indian tribal governments whose interests might be directly and substantially affected by activities on federally administered lands.

Although not regulation or law, the BLM also utilizes H-8120-1 (General Procedural Guidance for Native American Consultation) and National Register Bulletin 38 (Guidelines for Evaluating and Documenting Traditional Cultural Properties) in their consultation and evaluation of Native American issues.

3.22.2 Affected Environment

3.22.2.1 Study Methods

The study area for Native American Traditional Values is based on supporting documentation from an ethnographic assessment produced for the Project (Bengston 2007). The area includes Mount Hope in the northern portion of the study area and several springs including Garden Spring, McBrides Spring, Mount Hope Springs, and other unnamed springs. The southwestern corner of the study area includes a portion of Kobeh Valley. Information presented in the following sections is based on the results of the ethnographic assessment and the ongoing consultation process with participating tribes, organizations, and individuals for the Project. BLM coordination to date has included postal, phone, fax, and electronic correspondence, meetings, and various site visits. Some documents generated during the consultation process are included in Appendix **F** of this EIS. Certain sensitive information is on file at the MLFO and considered confidential.

3.22.2.2 Existing Conditions

3.22.2.2.1 Native American Consultation

In addition to the ongoing consultation process, MLFO utilized the services of an ethnographer to provide an additional vehicle for tribal participants to identify issues/concerns and be active in the Project.

MLFO consultation initiation/notification with federally recognized tribes and tribal organizations for the Project began in early 2007.

Current topics of discussion with the Duckwater Shoshone Tribe include, but are not limited to the following: Cultural Inventory; training/education opportunities; inadvertent discovery of human remains notification procedures (cautionary); use of tribal monitors/observers; Project-specific long-term monitoring, including CESA boundary; sensitive records confidentiality; identification of affected cultural sites/resources and development of impact lessening alternatives.

On February 6, 2007, the MLFO mailed certified consultation initiation letters (**see table in** Appendix **F**) to ten recognized tribal governments: Te-Moak Tribal Council; Elko Band Council; Wells Band Council; Battle Mountain Band Council; South Fork Band Council; Ely Shoshone Tribe; Duckwater Shoshone Tribe; Yomba Shoshone Tribe; Duck Valley Shoshone-Paiute Tribes; and the Timbisha Shoshone Tribe. Letters were also mailed to the Bureau of Indian Affairs, Eastern Nevada Agency, Western Shoshone Defense Project, and the Western Shoshone Committee of Duck Valley. The MLFO also provided the services of an ethnographer to assist the BLM and tribal participants in identifying any specific traditional/cultural site, activity, and resource concerns. A list of the number of follow-up contacts with each recognized tribal government and organizations is presented in Table 3.22-1. The Table in Appendix **F** provides the dates for these contacts.

On August 15, 2007, **the Southfork Band of the Te-Moak** Tribe issued a resolution in opposition of the Project citing the destruction of pine nut gathering areas, springs for the wildlife and bird life, and medicinal plants if the Project is implemented. One additional tribe,

the Bridgeport Indian Colony of California, mailed written comments on July 16, 2007, stating strong opposition to the Project. Site-specific information was not included in either letter, nor were there any request for further consultation or participation.

Table 3.22-1: Follow-up Contacts with Recognized Tribal Governments and Organizations

Recognized Tribal Government / Organizations	Number of Contacts
Battle Mountain Band Council	3
Duckwater Shoshone Tribe	56
Elko Band Council	4
Ely Shoshone Tribe	4
South Fork Band Council	5
Te-Moak Tribal Council	2
Wells Band Council	5
Yomba Shoshone Tribe	4

Of the initial tribal entities contacted, representatives and/or members of the Wells Band, South Fork Band, Timbisha Shoshone Tribe, Duckwater Shoshone Tribe, Ely Shoshone Tribe, and various other Western Shoshone individuals have participated throughout the process, with the Duckwater Shoshone Tribe being the most active. To date, the MLFO has conducted four field visits to the Project Area at the request of various tribal representatives, community members, and in particular the Duckwater Shoshone Tribe. Based on requests from the Duckwater Shoshone Tribe to review the cultural resource report for the Project, the MLFO has **entered into** a Project-specific MOU for information sharing and tribal monitoring with the Duckwater Shoshone Tribe.

On March 21, 2008, the MLFO mailed a draft PA for cultural resources on to the Te-Moak Tribal Council, Ely Shoshone Tribe, Duckwater Shoshone Tribe, and Yomba Shoshone Tribe. All tribes declined to be signatories on the PA. Of all the contacted, interested, and participating tribal entities, the Duckwater Shoshone Tribe has remained the most active.

3.22.2.2.2 Mount Hope Ethnographic Assessment

In 2007, MLFO also produced an ethnographic assessment of the Project Area and surrounding areas to determine the presence of previously recorded traditional cultural places, document contemporary tribal concerns, and provide recommendations for mitigation of culturally significant places identified by tribal representatives. Contact was made by telephone, mail, e-mail, faxes, and field visits (two) to the Project Area. Results of the assessment showed that the study area is culturally significant to the Western Shoshone; however, no specific places of cultural or religious importance were identified within the study area during the field tours. Three culturally significant places (Kobeh Valley, Sulphur Springs Range, and Roberts Mountains) were identified during the ethnographic literature review, but tribal representatives did not provide specific information concerning any of these areas during the field visits. The following concerns were voiced:

- Potential destruction of the existing piñon trees (no other species of concern were identified);
- Potential effects on the water, including potential destruction of springs;
- Potential effects on the wildlife in the area;

- Potential ecological effects of the removal of Mount Hope if mining is allowed to occur; and
- Air quality, particularly with respect to dust.

3.22.2.2.3 EML Communication with Native Americans

EML, between 2007 and 2010, has had a number of contacts and communications with the Duckwater Shoshone Tribe. The following is a listing of those contacts. This list includes coordination between EML and the Tribe and does not constitute consultation, which is a formal government to government process.

- EML representatives (Brian Musser) at Mount Hope with Duckwater July 2007.
- EML representatives (Zach Spencer and Brian Musser) at Duckwater Halloween October 31, 2007.
- EML representatives (Zach Spencer and George Blankenship) at Duckwater December 2007.
- EML representatives (Zach Spencer and Elaine Barkdull-Spencer) at Duckwater Annual Festival 2008.
- EML representatives (Zach and Pat Rogers) tour of Mount Hope July 15, 2008.
- EML representatives (Zach Spencer) at Duckwater Health Fair September 18, 2008.
- EML representatives (Zach Spencer and Pat Rogers) tour of Mount. Hope August 18, 2009.
- EML representatives (Zach Spencer, Pat Rogers, and Tim Arnold) at Duckwater October 2009.
- EML representatives (Zach Spencer and Kevin Kinsella) at Duckwater Halloween October 30, 2009.
- EML representatives (Zach Spencer, Lee Shumway, and Bill Albert) lunch with Gonnie Mendez in Elko April 2010.
- EML representatives (Zach Spencer, Tim Arnold, and Carrie Dubray) at Duckwater May 2010.
- EML representatives (Zach Spencer, Pat Rogers, Kevin Kinsella) et al. at Duckwater Annual Festival June 2010.
- EML representatives (Zach Spencer, Pat Rogers, Tim Arnold) September 2010.
- EML representatives (Zach Spencer and Lee Shumway) breakfast meeting with Gonnie Mendez in Elko October 2010.

3.22.3 Environmental Consequences and Mitigation Measures

3.22.3.1 Significance Criteria

The AIRFA and EO 13007 apply to sites used for religious ceremonies or sacred sites. However, consultation is ongoing and the BLM acknowledges that locations of nut producing pine tree stands may vary from year to year. These statutes do not specify criteria for determining whether a project would affect such places; however, for purposes of the analysis in the EIS, with respect to sites used for religious ceremonies as referred to in the AIRFA and to sacred sites as referred to in EO 13007, a project effect is considered significant if it restricts access to such sites, in some way impedes the exercise of ceremonies at such sites, or affects the physical integrity of such sites.

A site within an avoidance area (a Native American identified area of concern) would be considered susceptible to a significant effect under one (or more) of the following Project-related situations:

- Access is reduced or lost (EO 13007);
- Physical destruction or disturbance (EO 13007, NHPA);
- Alteration of setting (NHPA);
- Introduction of visual, noise, or atmospheric elements that are out of character (NHPA); or
- Area is somehow rendered unsuitable for traditional or religious use (EO 13007).

Effects on National Register eligible properties including properties that are eligible because of traditional religious or cultural values, are assessed in terms of criteria of adverse effects, listed in regulations implementing Section 106 of the NHPA, at 36 CFR 800.9. The effects include the following that are most applicable to TCPs:

- Destruction or alteration of all or part of a property;
- Isolation from or alteration of surrounding environment; or
- Introduction of visual, audible, or atmospheric elements that are out of character with a property or alter its setting.

3.22.3.2 Assessment Methodology

The Proposed Action and the alternatives were compared with the information developed in the ethnographic assessment and Native American Consultation process. The effects are determined to be significant or not significant based on the applicable significance criteria listed in Section 3.22.3.1.

3.22.3.3 Proposed Action

Although tribal participants have not made any formal TCPs designations or identified specific locations of religious or spiritual activity within or in close proximity to the Project Area, general concerns have been raised throughout the consultation process, such as: impacts to and loss of pine tree stands; impacts to water sources; disturbance of archaeological sites (prehistoric and ethno-historic); potential to encounter gravesites; loss of edible/medicinal plant species; impacts to wildlife; and participation in reclamation or "healing the Earth." Often, spiritual and/or religious beliefs/practices and certain resource impacts can be difficult if not impossible to mitigate. Therefore, at this time, the BLM is currently coordinating with those participating tribes and EML to identify impact lessening procedures/techniques, possible avoidance measures, and potential off and on site mitigation measures.

Mitigation of cultural resources sites, specific to archaeology, via data recovery (surface collecting and excavation), is often considered an adverse impact to tribes since they consider "artifact" removal to be erasing the evidence of the existence of their ancestors. Discussions to date have focused on tribal monitoring and observation during any data recovery and new surface disturbance; cultural resources and archaeological processes training and education; and identifying opportunities for youth and elder participation.

Impacts to pine trees and other plant species within the Project Area would occur. However, the BLM and the participating tribes are currently identifying possible species to be used for future reclamation purposes. Also, opportunities for off-site mitigation are also being made available, such as enhancing, preserving, and/or introducing traditional/cultural use plant species in other areas within the CESA boundary. Wood product use discussions are also occurring, such as tribal member and elder heating assistance program fire wood use.

3.22.3.3.1 Inadvertent Discoveries

Due to the area's extensive historic mining, ranching, and prehistoric/historic Native American habitation, there is a possibility for any surface disturbing activity to expose both nonnative and native gravesites.

- **Impact 3.22.3.3-1:** As a result of the Proposed Action, there could be an impact to Native American remains or artifacts.

  Significance of the Impact: This impact would be considered potentially significant; however, the impact would become less than significant after implementation of the mitigation measure described below.

- **Mitigation Measure 3.22.3.3-1:** In the case of inadvertent discovery of human remains, the BMDO Policy for the Discovery of Human Remains (**IM** NV-2010-001) – notification procedures - would be followed. If the remains are determined to be native, NAGPRA inadvertent discovery procedures would be adhered to. Under the NAGPRA, section (3)(d)(1), it states that the discovering individual must notify the land manager in writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation. Tribes, tribal organizations, possible lineal descendants, and individuals would then be contacted to determine cultural affiliation and subsequent transfer of custody procedures would begin.

  Effectiveness of Mitigation and Residual Effects: The Project could result in the exposure of Native American remains or artifacts. Implementation of Mitigation Measure 3.22.3.3-1 would prevent any impacts to these discoveries.

3.22.3.3.2 Impacts to Pine Nut Gathering Locations

To date, the MLFO consultation effort has not produced specific locational information concerning pine nut gathering locations within the Project Area. During field tours for the ethnographic assessment, Te-Moak Tribe representatives stated that the area north of Mount Hope was one of the last pine nut gathering areas still accessible to their families. If replanting of piñon trees occurs as a mitigation measure for the Project, representatives stated that it would be many years before the trees would bear pine nuts. The ethnographic assessment literature review conducted as part of the Mount Hope ethnographic assessment documented the Sulphur Springs Range and Roberts Mountains as being two locations that were historically accessed by Western Shoshone people for pine nut gathering and other resource utilization. Historic Shoshone camps were documented in these ranges but exact locations are unknown.

Development of the Proposed Action would result in the removal of approximately 3,**296** acres of piñon-juniper habitat. The return of piñon-juniper habitat to these areas would likely not occur for at least 75 to 100 years, if at all. Within the Project Area, approximately 3**4** percent of the piñon-juniper habitat would be directly impacted. In addition, 4,600 acres of piñon-juniper habitat not directly affected would not be available for pine nut gathering for the duration of the Project because that habitat would be within the Project fence boundary. To the south and north of the Project Area there is extensive piñon-juniper habitat, and within the BMDO planning area there are approximately 2,124,063 acres of piñon-juniper habitat.

- **Impact 3.22.3.3-2:** The Proposed Action would remove 3,**296** acres of piñon-juniper habitat, which includes piñon trees that would then not be available for pine nut gathering.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.22.3.1 since there are no identified avoidance areas.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.22.3.3-3:** The Proposed Action would restrict 4,600 acres of piñon-juniper habitat within the Project boundary fence, which would then not be available for pine nut gathering for the duration of the Project.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.22.3.1 since there are no identified avoidance areas. However, the following mitigation measure is proposed.

- **Mitigation Measure 3.22.3.3-3:** In years of greater than average cone production, as determined by the BLM **and requested by the tribes**, EML would make areas within the Project Area fence available for Native American pine nut gathering, subject to all applicable MSHA requirements.

3.22.3.3.3 Impacts to Water Resources

The Mount Hope ethnographic assessment documented environmental concerns including impacts to water resources; however, specific locations of environmental concerns have not been identified during the course of consultation for the Project. Western Shoshone people consider water resources to be sacred (Bengston 2007). Impacts to the water sources impact all other resources as well as the animals that utilize the water and plant foods for survival. Once the water is gone, then life would be gone, according to Shoshone representatives. Water sources, such as hot springs are also used for ceremonial purposes, although these types of sites have not yet been identified during the course of consultation.

As outlined in Section 3.2.3.3, the Proposed Action could impact 22 springs, 7.7 miles of perennial streams (Roberts Creek and Henderson Creek), **and 61.4 acres of riparian areas associated with these creeks**. This effect would principally occur in the Roberts Mountains. **Table 3.2-8 outlines the springs that would be affected.** As outlined in Section 3.11.3.3, the potential decline in the water table and potential decrease in flows in the springs and perennial drainages, may result in a change in the riparian and wetland vegetation. This potential indirect

effect would cover approximately four acres of riparian vegetation associated with springs and **61.4** acres associated with the 7.7 miles of perennial streams.

- **Impact 3.22.3.3-4:** The Proposed Action could impact 22 springs, 7.7 miles of perennial streams (Roberts Creek and Henderson Creek), **and 61.4 acres of riparian areas associated with these creeks,** which are, in a general nature, considered sacred by Native Americans.

  Significance of the Impact: Even though water has been identified through Native American Consultation by the BLM as an important issue to the Western Shoshone, none of the springs or perennial streams that could potentially be impacted by the Proposed Action have been specifically identified as traditional or religious use areas. Therefore, the Proposed Action impact does not meet the significance criteria listed in Section 3.22.3.1, and no resource specific mitigation measures were determined necessary. Mitigation for impacts to water resources have been identified in Section 3.2.3.3, which would have the potential of reducing some of the impacts.

3.22.3.3.4 Impacts to Cultural Sites

As outlined in Table 3.21-1, there are 100 prehistoric sites within the area of direct effect for the Proposed Action. Thirty-eight of the 100 sites are considered as eligible for the NRHP. Even though EML has identified that eligible sites would be treated prior to their removal and the initiation of Project construction, all 100 sites would be removed from the landscape as part of the Proposed Action. Since Native Americans view the removal of sites from the landscape as a method of "wiping their cultural footprint from the land," the removal of any sites is of concern to the Native Americans.

- **Impact 3.22.3.3-5:** The Proposed Action could impact 100 prehistoric cultural sites by removing them from the landscape.

  Significance of the Impact: The removal of any sites from the landscape is considered significant by the Native Americans. Therefore this impact is significant. As outlined in Section 3.21, those sites that are eligible for the NRHP would be treated prior to Project activities; however, this does not reduce the impact to Native Americans. Although prehistoric and ethnohistoric sites and associated artifacts exist within the general area of the proposed expansion, no Native American traditional use sites, activities, or associated resources are known to exist in proposed disturbance areas. Therefore, no mitigation measures specific to contemporary tribal uses are proposed.

  However, for those archaeological sites (prehistoric and historic) scheduled or proposed for treatment (i.e., data recovery/excavation), tribal participants would be given the opportunity to monitor the data recovery efforts, and provide interpretation of any artifacts or features discovered during the process. In addition, the BLM or a contracted Cultural Resources Specialist/Archaeologist, accompanied by designated tribal representatives and/or descendants, may conduct periodical or stipulated monitoring of sites scheduled for avoidance before, during, and after Project construction. Monitoring of identified archaeological sites within and in close proximity to proposed disturbance areas could occur throughout the life of the Project to ensure agreed upon avoidance.

3.22.3.3.5 Residual Adverse Impacts

The Proposed Action would have an unavoidable impact to pine nut gathering and potentially to springs and perennial streams in the vicinity of the Project. The Proposed Action would have an unavoidable and adverse impact to cultural sites within the footprint of the Project facilities.

3.22.3.4 No Action Alternative

3.22.3.4.1 Inadvertent Discoveries

The No Action Alternative is not expected to affect Native American remains or artifacts.

3.22.3.4.2 Impacts to Pine Nut Gathering Locations

The No Action Alternative would have a very limited impact on pine nut gathering, due to the removal of a small and undetermined number of acres of piñon-juniper habitat within the Project Area for road building.

- **Impact 3.22.3.4-1:** The No Action Alternative Action would remove a small and undetermined number of acres of piñon-juniper habitat, which would then not be available for pine nut gathering.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.22.3.1.

3.22.3.4.3 Impacts to Water Resources

The No Action Alternative would not affect springs or perennial streams.

3.22.3.4.4 Impacts to Cultural Sites

The No Action Alternative would not affect cultural sites.

3.22.3.4.5 Residual Adverse Impacts

The No Action Alternative would have an unavoidable impact to pine nut gathering.

3.22.3.5 Partial Backfill Alternative

3.22.3.5.1 Inadvertent Discoveries

- **Impact 3.22.3.5-1:** As a result of the Partial Backfill Alternative, there could be an impact to Native American remains or artifacts.

  Significance of the Impact: This impact would be considered potentially significant; however, the impact would become less than significant after implementation of the mitigation measure described below.

- **Mitigation Measure 3.22.3.5-1:** In the case of inadvertent discovery of human remains, the BMDO Policy for the Discovery of Human Remains (**IM** NV-2010-001) – notification procedures - would be followed. If the remains are determined to be native, NAGPRA inadvertent discovery procedures would be adhered to. Under the NAGPRA, section (3)(d)(1), it states that the discovering individual must notify the land manager in writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation. Tribes, tribal organizations, possible lineal descendants, and individuals would then be contacted to determine cultural affiliation and subsequent transfer of custody procedures would begin.

  Effectiveness of Mitigation and Residual Effects: The Project could result in the exposure of Native American remains or artifacts. Implementation of Mitigation Measure 3.22.3.5-1 would prevent any impacts to these discoveries.

3.22.3.5.2 Impacts to Pine Nut Gathering Locations

To date, the MLFO consultation effort has not produced specific locational information concerning pine nut gathering locations within the Project Area. Impacts to pine nut gathering locations from the Partial Backfill Alternative would be the same as under the Proposed Action. If replanting of piñon trees occurs as a mitigation measure for the Project, representatives stated that it would be many years before the trees would bear pine nuts. The ethnographic assessment literature review conducted as part of the Mount Hope ethnographic assessment documented the Sulphur Springs Range and Roberts Mountains as being two locations that were historically accessed by Western Shoshone people for pine nut gathering and other resource exploitation. Historic Shoshone camps were documented in these ranges but exact locations are unknown.

Development of the Partial Backfill Alternative would result in the removal of approximately 3,**296** acres of piñon-juniper habitat. The return of piñon-juniper habitat to these acres would likely not occur for at least 75 to 100 years, if at all. Within the Project Area, approximately 3**4** percent of the piñon-juniper habitat would be directly impacted. In addition, 4,600 acres of piñon-juniper habitat not directly affected would not be available for pine nut gathering for the duration of the Project because that habitat would be within the Project fence boundary. To the south and north of the Project Area there is extensive piñon-juniper habitat.

- **Impact 3.22.3.5-2:** The Partial Backfill Alternative would remove 3,**296** acres of piñon-juniper habitat, which would then not be available for pine nut gathering.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.22.3.1 since there are no identified avoidance areas.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.22.3.5-3:** The Partial Backfill Project Alternative would restrict 4,600 acres of piñon-juniper habitat within the Project boundary fence, which would then not be available for pine nut gathering for the duration of the Project.

Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.22.3.1 since there are no identified avoidance areas. However, the following mitigation measure is proposed.

- **Mitigation Measure 3.22.3.5-3:** In years of greater than average cone production, as determined by the BLM **and requested by the tribes**, EML would make areas within the Project Area fence available for Native American pine nut gathering, subject to all applicable MSHA requirements.

3.22.3.5.3 Impacts to Water Resources

The Mount Hope ethnographic assessment documented environmental concerns including impacts to water resources, but specific locations have not been identified during the course of consultation for the Project. Western Shoshone people consider water resources to be sacred (Bengston 2007). Impacts to water resources from the Partial Backfill Alternative would be the same as under the Proposed Action. Once the water is gone, then life would be gone, according to Shoshone representatives. Water sources, such as hot springs are also used for ceremonial purposes, although these types of sites have not yet been identified during the course of consultation.

As outlined in Section 3.2.3.3, the Proposed Action could impact 22 springs, 7.7 miles of perennial streams (Roberts Creek and Henderson Creek), **and 61.4 acres of riparian areas associated with these creeks**. This effect would principally occur on Roberts Mountain. **Table 3.2-8 outlines the springs that would be affected.** As outlined in Section 3.11.3.3, the potential decline in the water table and potential decrease in flows in the springs and perennial drainages, may result in a change in the riparian and wetland vegetation. This potential indirect effect would cover approximately four acres of riparian vegetation associated with springs and an undetermined number of acres associated with the 7.7 miles of perennial streams.

- **Impact 3.22.3.5-4:** The Partial Backfill Alternative could impact 22 springs, 7.7 miles of perennial streams (Roberts Creek and Henderson Creek), **and 61.4 acres of riparian areas associated with these creeks,** which are, in a general nature, considered sacred by Native Americans.

  Significance of the Impact: Even though water has been identified through Native American Consultation by the BLM as an important issue to the Western Shoshone, none of the springs or perennial streams that could potentially be impacted by the Proposed Action have been specifically identified as traditional or religious use areas. Therefore, the Partial Backfill Alternative impact does not meet the significance criteria listed in Section 3.22.3.1, and no resource specific mitigation measures were proposed. Mitigation for impacts to water resources have been identified in Section 3.2.3.5, which would have the potential of reducing some of the impacts.

3.22.3.5.4 Impacts to Cultural Sites

As outlined in Table 3.21-1, there are 100 prehistoric sites within the area of direct effect for the Partial Backfill Alternative. Thirty-eight of the 100 sites are considered as eligible for the NRHP. Even though EML has identified that eligible sites would be treated prior to their removal and the initiation of Project construction, all 100 sites would be removed from the landscape as part

of the Partial Backfill Alternative. Since Native Americans view the removal of sites from the landscape as a method of "wiping their cultural footprint from the land", the removal of any sites is of concern to the Native Americans.

- **Impact 3.22.3.5-5:** The Partial Backfill Alternative could impact 100 prehistoric cultural sites by removing them from the landscape.

  Significance of the Impact: The removal of any sites from the landscape is considered significant by the Native Americans. Therefore this impact is significant. As outlined in Section 3.21, those sites that are eligible for the NRHP would be treated prior to Project activities; however, this does not reduce the impact to Native Americans. Although prehistoric and ethnohistoric sites and associated artifacts exist within the general area of the proposed expansion, no Native American traditional use sites, activities, or associated resources are known to exist in proposed disturbance areas. Therefore, no mitigation measures specific to contemporary tribal uses are proposed.

  However, for those archaeological sites (prehistoric and historic) scheduled or proposed for treatment (i.e., data recovery/excavation), tribal participants would be given the opportunity to monitor the data recovery efforts, and provide interpretation of any artifacts or features discovered during the process. In addition, the BLM or a contracted Cultural Resources Specialist/Archaeologist, accompanied by designated tribal representatives and/or descendants, may conduct periodical or stipulated monitoring of sites scheduled for avoidance before, during, and after Project construction. Monitoring of identified archaeological sites within and in close proximity to proposed disturbance areas could occur throughout the life of the Project to ensure agreed upon avoidance.

3.22.3.5.5 Residual Adverse Impacts

The Partial Backfill Alternative would have an unavoidable impact to pine nut gathering and potentially to springs and perennial streams in the vicinity of the Project. The Partial Backfill Alternative would have an unavoidable and adverse impact to cultural sites within the footprint of the Project facilities.

3.22.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

3.22.3.6.1 Inadvertent Discoveries

- **Impact 3.22.3.6-1:** As a result of the Off-Site Transfer of Ore Concentrate for Processing Alternative, there could be an impact to Native American remains or artifacts.

  Significance of the Impact: This impact would be considered potentially significant; however, the impact would become less than significant after implementation of the mitigation measure described below.

- **Mitigation Measure 3.22.3.6-1:** In the case of inadvertent discovery of human remains, the BMDO Policy for the Discovery of Human Remains (**IM** NV-2010-001) – notification procedures - would be followed. If the remains are determined to be native, NAGPRA inadvertent discovery procedures would be adhered to. Under the NAGPRA, section (3)(d)(1), it states that the discovering individual must notify the land manager in

writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation. Tribes, tribal organizations, possible lineal descendants, and individuals would then be contacted to determine cultural affiliation and subsequent transfer of custody procedures would begin.

Effectiveness of Mitigation and Residual Effects: The Project could result in the exposure of Native American remains or artifacts. Implementation of Mitigation Measure 3.22.3.6-1 would prevent any impacts to these discoveries.

3.22.3.6.2 Impacts to Pine Nut Gathering Locations

To date, the MLFO consultation effort has not produced specific locational information concerning pine nut gathering locations within the Project Area. During field tours for the ethnographic assessment, Te-Moak Tribe representatives stated that the area north of Mount Hope was one of the last pine nut gathering areas still accessible to their families. If replanting of piñon trees occurs as a mitigation measure for the Project, representatives stated that it would be many years before the trees would bear pine nuts. The ethnographic assessment literature review conducted as part of the Mount Hope ethnographic assessment documented the Sulphur Springs Range and Roberts Mountains as being two locations that were historically accessed by Western Shoshone people for pine nut gathering and other resource exploitation. Historic Shoshone camps were documented in these ranges but exact locations are unknown.

Development of the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the removal of approximately 3,**296** acres of piñon-juniper or piñon habitat. The return of piñon-juniper habitat to these acres would likely not occur for at least 75 to 100 years, if at all. Within the Project Area, approximately 3**4** percent of the piñon-juniper habitat would be directly impacted. In addition, 4,600 acres of piñon-juniper habitat not directly affected would not be available for pine nut gathering for the duration of the Project because that habitat would be within the Project fence boundary. To the south and north of the Project Area there is extensive piñon-juniper habitat.

- **Impact 3.22.3.6-2:** The Off-Site Transfer of Ore Concentrate for Processing Alternative would remove 3,**296** acres of piñon-juniper habitat, which would then not be available for pine nut gathering.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.22.3.1 since there are no identified avoidance areas.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.22.3.6-3:** The Off-Site Transfer of Ore Concentrate for Processing Alternative would restrict 4,600 acres of piñon-juniper habitat within the Project boundary fence, which would then not be available for pine nut gathering for the duration of the Project.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.22.3.1 since there are no identified avoidance areas. However, the following mitigation measure is proposed.

- **Mitigation Measure 3.22.3.6-3:** In years of greater than average cone production, as determined by the BLM **and requested by the tribes**, EML would make areas within the Project Area fence available for Native American pine nut gathering, subject to all applicable MSHA requirements.

3.22.3.6.3 Impacts to Water Resources

The Mount Hope ethnographic assessment documented environmental concerns including impacts to water resources, but specific locations have not been identified during the course of consultation for the Project. Western Shoshone people consider water resources to be sacred (Bengston 2007). Impacts to the water sources impact all other resources as well as the animals that utilize the water and plant foods for survival. Once the water is gone, then life would be gone, according to Shoshone representatives. Water sources, such as hot springs are also used for ceremonial purposes, although these types of sites have not yet been identified during the course of consultation.

As outlined in Section 3.2.3.3, the Proposed Action could impact 22 springs, 7.7 miles of perennial streams (Roberts Creek and Henderson Creek), **and 61.4 acres of riparian areas associated with these creeks**. This effect would principally occur in the Roberts Mountains. **Table 3.2-8 outlines the springs that would be affected.** As outlined in Section 3.11.3.3, the potential decline in the water table and potential decrease in flows in the springs and perennial drainages, may result in a change in the riparian and wetland vegetation. This potential indirect effect would cover approximately four acres of riparian vegetation associated with springs and **61.4** acres associated with the 7.7 miles of perennial streams.

- **Impact 3.22.3.6-4:** The Off-Site Transfer of Ore Concentrate for Processing Alternative could impact 22 springs, 7.7 miles of perennial streams (Roberts Creek and Henderson Creek), **and 61.4 acres of riparian areas associated with these creeks,** which are, in a general nature, considered sacred by Native Americans.

  Significance of the Impact: Even though water has been identified through Native American Consultation by the BLM as an important issue to the Western Shoshone, none of the springs or perennial streams that could potentially be impacted by the Proposed Action have been specifically identified as traditional or religious use areas. Therefore, the Off-Site Transfer of Ore Concentrate for Processing Alternative impact does not meet the significance criteria listed in Section 3.22.3.1, and no resource specific mitigation measures were determined necessary. Mitigation for impacts to water resources have been identified in Section 3.2.3.6, which would have the potential of reducing some of the impacts.

3.22.3.6.4 Impacts to Cultural Sites

As outlined in Table 3.21-1, there are 100 prehistoric sites within the area of direct effect for the Off-Site Transfer of Ore Concentrate for Processing Alternative. 38 of the 100 sites are considered as eligible for the NRHP. Even though EML has identified that eligible sites would be treated prior to their removal and the initiation of Project construction, all 100 sites would be removed from the landscape as part of the Off-Site Transfer of Ore Concentrate for Processing Alternative. Since Native Americans view the removal of sites from the landscape as a method of

"wiping their cultural footprint from the land", the removal of any sites is of concern to the Native Americans.

- **Impact 3.22.3.6-5:** The Off-Site Transfer of Ore Concentrate for Processing Alternative could impact 100 prehistoric cultural sites by removing them from the landscape.

  Significance of the Impact: The removal of any sites from the landscape is considered significant by the Native Americans. Therefore this impact is significant. As outlined in Section 3.21, those sites that are eligible for the NRHP would be treated prior to Project activities; however, this does not reduce the impact to Native Americans. Although prehistoric and ethnohistoric sites and associated artifacts exist within the general area of the proposed expansion, no Native American traditional use sites, activities, or associated resources are known to exist in proposed disturbance areas. Therefore, no mitigation measures specific to contemporary tribal uses is proposed.

  However, for those archaeological sites (prehistoric and historic) scheduled or proposed for treatment (i.e., data recovery/excavation), tribal participants would be given the opportunity to monitor the data recovery efforts, and provide interpretation of any artifacts or features discovered during the process. In addition, the BLM or a contracted Cultural Resources Specialist/Archaeologist, accompanied by designated tribal representatives and/or descendants, may conduct periodical or stipulated monitoring of sites scheduled for avoidance before, during, and after project construction. Monitoring of identified archaeological sites within and in close proximity to proposed disturbance areas could occur throughout the life of the project to ensure agreed upon avoidance.

3.22.3.6.5 Residual Adverse Impacts

The Off-Site Transfer of Concentrate for Processing Alternative would have an unavoidable, but not adverse impact to pine nut gathering and potentially to springs and perennial streams in the vicinity of the Project. The Off-Site Transfer of Ore Concentrate for Processing Alternative would have an unavoidable and adverse impact to cultural sites within the footprint of the Project facilities.

3.22.3.7 Slower, Longer Project Alternative

3.22.3.7.1 Inadvertent Discoveries

- **Impact 3.22.3.7-1:** As a result of the Slower, Longer Project Alternative, there could be an impact to Native American remains or artifacts.

  Significance of the Impact: This impact would be considered potentially significant; however, the impact would become less than significant after implementation of the mitigation measure described below.

- **Mitigation Measure 3.22.3.7-1:** In the case of inadvertent discovery of human remains, the BMDO Policy for the Discovery of Human Remains (**IM** NV-2010-001) – notification procedures - would be followed. If the remains are determined to be native, NAGPRA inadvertent discovery procedures would be adhered to. Under the NAGPRA, section (3)(d)(1), it states that the discovering individual must notify the land manager in

writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation. Tribes, tribal organizations, possible lineal descendants, and individuals would then be contacted to determine cultural affiliation and subsequent transfer of custody procedures would begin.

Effectiveness of Mitigation and Residual Effects: The Project could result in the exposure of Native American remains or artifacts. Implementation of Mitigation Measure 3.22.3.7-1 would prevent any impacts to these discoveries.

3.22.3.7.2 Impacts to Pine Nut Gathering Locations

To date, the MLFO consultation effort has not produced specific locational information concerning pine nut gathering locations within the Project Area. Impacts to pine nut gathering locations from the Slower, Longer Project Alternative would be the same as under the Proposed Action. If replanting of piñon trees occurs as a mitigation measure for the Project, representatives stated that it would be many years before the trees would bear pine nuts. The ethnographic assessment literature review conducted as part of the Mount Hope ethnographic assessment documented the Sulphur Springs Range and Roberts Mountains as being two locations that were historically accessed by Western Shoshone people for pine nut gathering and other resource exploitation. Historic Shoshone camps were documented in these ranges but exact locations are unknown.

Development of the Slower, Longer Project Alternative would result in the removal of approximately 3,**296** acres of piñon-juniper habitat. The return of piñon-juniper habitat to these acres would likely not occur for at least 75 to 100 years, if at all. Within the Project Area, approximately 3**4** percent of the piñon-juniper habitat would be directly impacted. In addition, 4,600 acres of piñon-juniper habitat not directly affected would not be available for pine nut gathering for the duration of the Project because that habitat would be within the Project fence boundary. To the south and north of the Project Area there is extensive piñon-juniper habitat.

- **Impact 3.22.3.7-2:** The Slower, Longer Project Alternative would remove 3,**296** acres of piñon-juniper habitat, which would then not be available for pine nut gathering.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.22.3.1 since there are no identified avoidance areas.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.22.3.7-3:** The Slower, Longer Project Alternative would restrict 4,600 acres of piñon-juniper habitat within the Project boundary fence, which would then not be available for pine nut gathering for the duration of the Project.

  Significance of the Impact: The impact does not meet the significance criteria listed in Section 3.22.3.1 since there are no identified avoidance areas. However, the following mitigation measure is proposed.

- **Mitigation Measure 3.22.3.7-3:** In years of greater than average cone production, as determined by the BLM **and requested by the tribes**, EML would make areas within the Project Area fence available for Native American pine nut gathering, subject to all applicable MSHA requirements.

3.22.3.7.3 Impacts to Water Resources

The Mount Hope ethnographic assessment documented environmental concerns including impacts to water resources, but specific locations have not been identified during the course of consultation for the Project. Western Shoshone people consider water resources to be sacred (Bengston 2007). Impacts to water resources from the Slower, Longer Project Alternative would be the same as under the Proposed Action. Once the water is gone, then life would be gone, according to Shoshone representatives. Water sources, such as hot springs are also used for ceremonial purposes, although these types of sites have not yet been identified during the course of consultation.

As outlined in Section 3.2.3.3, the Proposed Action could impact 22 springs**,** 7.7 miles of perennial streams (Roberts Creek and Henderson Creek)**, and 61.4 acres of riparian areas associated with these creeks**. This effect would principally occur in the Roberts Mountains. **Table 3.2-8 outlines the springs that would be affected.** As outlined in Section 3.11.3.3, the potential decline in the water table and potential decrease in flows in the springs and perennial drainages, may result in a change in the riparian and wetland vegetation. This potential indirect effect would cover approximately four acres or riparian vegetation associated with springs and **61.4** acres associated with the 7.7 miles of perennial streams.

- **Impact 3.22.3.7-4:** The Slower, Longer Project Alternative could impact **29** springs**,** 7.7 miles of perennial streams (Roberts Creek and Henderson Creek), **and 61.4 acres of riparian areas associated with these creeks,** which are, in a general nature, considered sacred by Native Americans.

  Significance of the Impact: Even though water has been identified through Native American Consultation by the BLM as an important issue to the Western Shoshone, none of the springs or perennial streams that could potentially be impacted by the Proposed Action have been specifically identified as traditional or religious use areas. Therefore, the Slower, Longer Project Alternative impact does not meet the significance criteria listed in Section 3.22.3.1, and no resource specific mitigation measures were determined necessary. Mitigation for impacts to water resources have been identified in Section 3.2.3.5, which would have the potential of reducing some of the impacts.

3.22.3.7.4 Impacts to Cultural Sites

As outlined in Table 3.21-1, there are 100 prehistoric sites within the area of direct effect for the Slower, Longer Project Alternative. Thirty-eight of the 100 sites are considered as eligible for the NRHP. Even though EML has identified that eligible sites would be treated prior to their removal and the initiation of Project construction, all 100 sites would be removed from the landscape as part of the Slower, Longer Project Alternative. Since Native Americans view the removal of sites from the landscape as a method of "wiping their cultural footprint from the land", the removal of any sites is of concern to the Native Americans.

- **Impact 3.22.3.7-5:** The Slower, Longer Project Alternative could impact 100 prehistoric cultural sites by removing them from the landscape.

  Significance of the Impact: The removal of any sites from the landscape is considered significant by the Native Americans. Therefore this impact is significant. As outlined in Section 3.21, those sites that are eligible for the NRHP would be treated prior to Project activities; however, this does not reduce the impact to Native Americans. Although prehistoric and ethnohistoric sites and associated artifacts exist within the general area of the proposed expansion, no Native American traditional use sites, activities, or associated resources are known to exist in proposed disturbance areas. Therefore, no mitigation measures specific to contemporary tribal uses is proposed.

  However, for those archaeological sites (prehistoric and historic) scheduled or proposed for treatment (i.e., data recovery/excavation), tribal participants would be given the opportunity to monitor the data recovery efforts, and provide interpretation of any artifacts or features discovered during the process. In addition, the BLM or a contracted Cultural Resources Specialist/Archaeologist, accompanied by designated tribal representatives and/or descendants, may conduct periodical or stipulated monitoring of sites scheduled for avoidance before, during, and after Project construction. Monitoring of identified archaeological sites within and in close proximity to proposed disturbance areas could occur throughout the life of the Project to ensure agreed upon avoidance.

3.22.3.7.5 Residual Adverse Impacts

The Slower, Longer Project Alternative would have an unavoidable impact to pine nut gathering and potentially to springs and perennial streams in the vicinity of the Project. The Slower, Longer Project Alternative would have an unavoidable and adverse impact to cultural sites within the footprint of the Project facilities.

3.23 Wildlife and Fisheries Resources

3.23.1 Regulatory Framework

This section discusses the laws, regulations, guidelines, and procedures that apply to management of wildlife resources potentially affected by the Project.

3.23.1.1.1 BLM/NDOW Memorandum of Understanding

Wildlife and fish resources and their habitat on public lands are managed cooperatively by the BLM and NDOW under a MOU as established in 1971. The MOU describes the BLM's commitment to manage wildlife and fisheries resource habitat, and the NDOW's role in managing populations. The ecological definition of population is a group of organisms of one species that interbreed and live in the same place at the same time. The BLM meets its obligations by managing public lands to protect and enhance food, shelter, and breeding areas for wild animals. The NDOW assures healthy wildlife numbers through a variety of management tools including wildlife and fisheries stocking programs, hunting and fishing regulations, land purchases for wildlife management, cooperative enhancement projects, and other activities.

3.23.1.1.2 Nevada Department of Wildlife Programs

The NDOW is the state agency responsible for the restoration and management of fish and wildlife resources within the state. The NDOW administers state wildlife management and protection programs as set forth in NRS Chapter 501, Wildlife Administration and Enforcement, and NAC Chapter 503, Hunting, Fishing and Trapping; Miscellaneous Protective Measures. NRS 501.110 defines the various categories of wildlife in Nevada, including protected categories. NAC 503.010-503.080, 503.110, and 503.140 list the wildlife species currently placed in the state's various legal categories, including protected species, game species, and pest species.

3.23.1.1.3 Special Status Wildlife Species

Species in need of additional management and protection, due to declining numbers or loss of habitat are termed "special status species." These animals are protected under provisions of the ESA or the Nevada BLM sensitive status (BLM Manual 6840.06 C). In addition, there is a Nevada State Protected Animal List (NAC 501.100 - 503.104) that BLM has incorporated, in part, into the sensitive list. The BLM sensitive species list is included as Appendix **G**.

3.23.1.1.4 Endangered Species Act

The ESA safeguards the continued existence of any species classified as "endangered" or "threatened", as well as habitat that is determined by the Secretary of the Interior to be critical to such species. The ESA is administered by the USFWS, in consultation with other federal and state agencies. The ESA defines the following terms:

- Endangered species: "... any species which is in danger of extinction throughout all or a significant portion of its range..."
- Threatened species: "... any species which is likely to become an endangered species within the foreseeable future..."
- Critical habitat: "... the specific areas within the geographical area occupied by the species... on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection..."

The ESA prohibits the "take" (i.e., killing, harming, or harassment) of listed threatened or endangered species without special exemptions. Protection under the ESA also extends to species and habitat proposed for listing (proposed). Candidate species are species for which sufficient information on the vulnerability and threats to the species exists to warrant listing as threatened or endangered, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA. The USFWS encourages cooperative conservation efforts for these species because they are, by definition, species that may warrant future protection under the ESA. Analogous to the ESA, Nevada State law (NRS 527.270-.300) prohibits removal or destruction of species listed as "threatened with extinction" except by special permit from the USFWS.

In addition to listed threatened or endangered and candidate species, the USFWS identifies another group of species known as species of concern (formerly candidate, Category 2 species). Species of concern are not specifically afforded the same protection under the ESA as Threatened or endangered species, but federal agencies are required to afford them consideration in their planning and decision-making processes. The BLM evaluates species of concern in a manner analogous to threatened or endangered species. On May 1, 1996, the NSO incorporated all former USFWS-designated Category 2 candidate species into the Nevada Special Status Species List and classified them as sensitive. Sensitive species are protected by BLM policy that requires that actions authorized, funded, or carried out by the agency do not contribute to the listing of any candidate or sensitive species as threatened or endangered under the ESA.

3.23.1.1.5 Migratory Bird Treaty Act

Migratory bird means any bird listed in the 50 CFR 10.13. All native birds commonly found in the U.S., with the exception of native resident gallinaceous birds, are protected under the provisions of the MBTA. Under this act, nests with eggs or the young of migratory birds may not be harmed, nor may any migratory birds be killed. Measures to prevent bird mortality must be incorporated into the Project's design as discussed in Section 2.1.15.5.

3.23.1.1.6 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668) applies primarily to taking, hunting, and trading activities that involve any bald (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos*). The act prohibits the direct or indirect take of an eagle, eagle part or product, nest, or egg. The term "take" as used in the act includes "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb."

Golden eagles are protected by the MBTA and the Bald and Golden Eagle Protection Act, both of which prohibit take. The Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance provides guidance to conduct informed impact analyses and mitigation during the NEPA process (USFWS 2010).

3.23.2 Affected Environment

3.23.2.1 Study Methods

Surveys for wildlife, including mammals, birds, and reptiles were conducted aerially and on the ground in June 2005 and in July and August of 2006 for the majority of the Project Area (SRK 2007b, 2007c). The Kobeh Valley portion of the Project Area was surveyed for wildlife in July 2008 (Great Basin Ecology 2008).

Survey information for special status species in the Project Area was requested from the NNHP and the USFWS. The lists provided by the NNHP and the USFWS identified the following animal species with potential to occur within the region: pygmy rabbit (*Brachylagus idahoensis*), BLM sensitive species; and the yellow-billed cuckoo (*Coccyzus americanus*), a USFWS candidate species. The BLM identified the following additional special status species with potential to occur in the region: greater sage-grouse, a USFWS candidate species; Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*), a federally listed threatened species; burrowing

owl (*Athene cunicularia*), BLM sensitive species; and migratory birds and raptors protected under the MBTA.

3.23.2.1.1 Pygmy Rabbits

A helicopter survey was conducted on April 28, 2006, for wildlife and to search for raptor nests in the higher elevations including rock outcrops and ledges of the Project Area. During aerial surveys in the spring of 2006, pygmy rabbit habitat was aerially mapped using big sagebrush vegetation. Two separate areas of potential habitat were identified from the aerial surveys conducted in the spring, the Kobeh Valley site and the eastern flank of Mount Hope. Surveys were conducted in August 2006 in all locations that were determined to be suitable for pygmy rabbits. These areas typically occurred in elevations ranging between 6,000 and 7,000 feet amsl.

Meandering transects were surveyed through suitable habitat according to NDOW protocol and both pygmy rabbits and their burrows were noted when located. UTM coordinates (NAD 27) were recorded, along with photographs and habitat descriptions for each observation or burrow site. Often burrow sites are a multi-entranced burrow complex and were identified when adequate pellets in the area suggested annual use. A diverse composition of pellets was assumed to signify both historic and current use of the burrow. If only older pellets were located, the site was noted as inactive. Any burrow with recent fecal pellets was noted as active and an actual pygmy rabbit observation indicated an active site. The same survey protocol was utilized during the July 2008 survey of the Kobeh Valley portion of the Project Area.

3.23.2.1.2 Springsnails

A presence/absence survey for springsnails (*Pyrogulopsis* sp.) was conducted in the Project Area on July 9, 2007. The survey was conducted in the middle of summer when perennial springs were flowing and intermittent springs would be at low flow (SRK 2007d). A subsequent presence or absence springsnail survey was conducted between September 27 and October 31, 2007 (SRK 2010). Streams in the larger regional area, including streams near the ten-foot water drawdown contour, were surveyed. Although no springsnails were present within the Project Area or the predicted ten-foot water drawdown contour surveyed, springsnails were noted in locations near the predicted drawdown boundary (to the northwest of the northern boundary and to the southeast of the southern boundary) (SRK 2010).

3.23.2.1.3 Bats

Twenty-one openings provided access to 12 discrete mines. These openings were surveyed during warm and cold seasons for bat species and habitat in the Project Area (Sherwin 2007).

3.23.2.1.4 **Pit Lake Wildlife** Risk Assessment

A SLERA of the proposed pit lake was prepared for the analysis of the Project (SRK 2009). The SLERA has four main objectives: 1) identification of those inorganic chemical constituents and chemical characteristics (e.g., pH, TDS) based on model predictions that may have the potential to contribute to adverse affects on mammal and avian wildlife as per NAC 445B.429; 2) identify ecological receptors, or appropriate surrogate species occupying similar niches, with the highest potential for exposure to chemical constituents in the pit water; 3) identify complete exposure pathways between the post-mining pit lake and the identified receptors; and 4) quantitatively or

qualitatively assess the ecological risks to select mammal and avian wildlife receptors exposed to inorganic chemical constituents in water whose concentration in the post-mining pit lake is predicted to exceed the calculated screening level toxicity criteria.

3.23.2.2 Existing Conditions

3.23.2.2.1 General Wildlife and Fisheries

Wildlife species and habitats occurring in the Project Area are typical of the northern Great Basin desert region. Results for the 2005, 2006, and 2008 surveys are included below. The general wildlife species are listed to indicate which species are commonly encountered in the Project Area and vicinity.

Important wildlife habitat in the Project Area is located in the big sagebrush (mountain and Wyoming big sagebrush), piñon-juniper woodlands, black sage, low sagebrush, and salt desert scrub vegetation types. The components of these habitats are described in the vegetation section (Section 3.9). Big sagebrush provides important habitat for many sagebrush obligate and facultative wildlife species. Piñon-juniper woodlands provide structural diversity for wildlife species as both thermal cover and food sources, particularly during the winter season. The salt desert scrub vegetation type also provides habitat for wildlife species. As a result of the limited water availability associated with salt desert scrub, the habitat is used seasonally by larger animals and provides a lower abundance of smaller animals than found in the more mesic plant communities. Similarly, the low sagebrush areas provide seasonal habitat for some species and year-round habitat for smaller animal species. Wetlands and riparian communities within the Project Area are limited to small seeps and springs (see Section 3.11).

Common wildlife species, those that are not special status species or migratory birds, are relatively abundant within and adjacent to the Project Area. Migratory birds and special status species, such as those listed as threatened, endangered, or sensitive by government agencies are covered below under special status species.

Mammals

The mammal species within the Project Area include those typically found in lower and mid-elevation Great Basin habitats. Mammalian species observed in or near the Project Area include mule deer, pronghorn antelope, black-tailed jackrabbits (*Lepus californicus*), yellow-bellied marmots (*Marmota flaviventris*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), badger (*Taxidea taxis*), mountain cottontail (*Sylvilagus nuttallii*), and a variety of other small mammals (i.e., mice, voles, chipmunks) (SRK 2007b).

Mountain lions prey on mule deer and are known to occur within the Project Area. The topography of the Project Area is desirable for mountain lions and two lions were harvested just west and north of the Project Area (NDOW Public Scoping Comments March 16, 2007).

Mule deer utilize the wooded hills and sagebrush habitats within and adjacent to the Project Area. **A moderate increase in spring fawn recruitment rates, resulted in an increasing** mule deer population **trend in 2012 (NDOW 2012)**. The trend for the Roberts Mountains (unit 143) portion of the overall management area follows the current trend of stable to downward. The Roberts Mountains deer are migratory in nature. Mule deer leave the Roberts Mountains in

October or November and migrate south into the Mountain Boy and Fish Creek Ranges south of U.S. Highway 50. The migration pattern includes moving south from Roberts Creek Ranch to Lone Mountain and from Henderson Summit along Whistler Mountain to Devil's Gate (NDOW Public Scoping Comments, March 16, 2007). Mule deer corridors are illustrated on Figure 3.23.1.

The immediate area around Mount Hope has limited summer range for mule deer due to the lack of water and mountain brush vegetation community. There are a few deer that reside on Mount Hope. Increased numbers of deer migrate through the Mount Hope area from summer ranges in the north and west during the fall and spring (NDOW Public Scoping Comments, March 16, 2007).

Pronghorn antelope were observed on the west side of the Project Area during the quarterly water sampling in November 2006 (SRK 2007b) and were observed in the lower elevations of the Project Area that are located in Kobeh Valley where low sagebrush and rabbitbrush were prominent. The population of pronghorn antelope in NDOW units 141, 143, and 151 through 155 has been in an upward trend. **The average fawn ratio for the past five years was 49 fawns to 100 does. This was above long-term averages and resulted in strong population growth (NDOW 2012).** The pronghorn antelope population in Kobeh Valley is low and variable with most of the antelope observed in the southern part of the valley near Lone Mountain and U.S. Highway 50 (NDOW Public Scoping Comments, March 16, 2007).

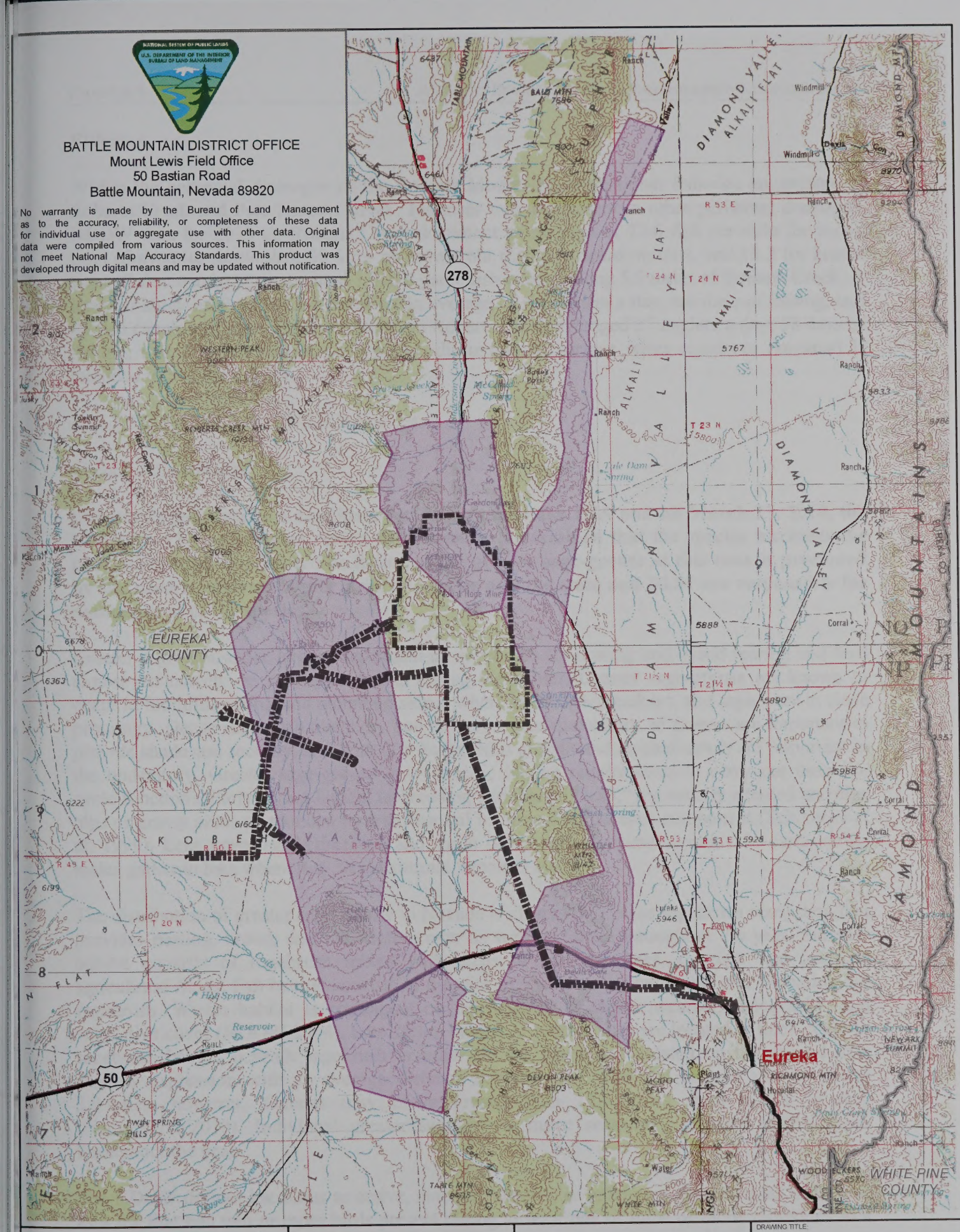
Game Birds

Few game birds are known to occur within the Project Area; however, chukar and mourning dove, occur in and adjacent to the Project Area. Even though greater sage-grouse is a game bird, this species is discussed under special status species.

Chukar typically inhabit rock outcrops and ledges adjoining grassy and sagebrush hillsides. Chukar are common in the Roberts Mountains, Whistler Mountain, and Sulphur Springs Ranges (NDOW Public Scoping Comments, March 16, 2007). Seasonal habitat occupation occurs in accordance with increased moisture and heavy snows. The birds typically move to lower elevations and south-facing slopes during heavy snow events and concentrate around spring sources in the summer months. Mourning doves usually forage on seeds in more open terrain and nest and roost in the trees. Mourning doves are commonly found along unimproved roads where they obtain gravel for food digestion. During the summer months the doves are commonly found near springs and artificial water sources (e.g., cow troughs, guzzlers, etc.) and migrate south for the winter (SRK 2007b). Mourning doves nest and forage in the area from spring to early autumn (NDOW Public Scoping Comments, March 16, 2007).

Reptiles

There are a variety of reptiles (i.e., snakes and lizards) that are commonly found in the sagebrush or rock outcrops and talus slopes in the Project Area. No reptilian surveys were conducted; however, it is likely that species such as the western fence lizard (*Sceloporus occidentalis*), northern sagebrush lizard (*Sceloporus graciosus*), leopard lizard (*Gambelia wislizenii*), western whiptail lizard (*Cnemidophorus tigris*), and horned lizard (*Phrynosoma* spp.) occur within the Project Area. The Great Basin rattlesnake (*Crotalus viridis lutosis*) is also likely to occur in the broken rocks and brush habitats within the Project Area. It is possible that other species not mentioned may occur within the Project Area.


BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.
EUREKA COUNTY
WHITE PINE COUNTY
Eureka
278
50
DIAMOND VALLEY
DIAMOND MOUNTAINS
KOBEH VALLEY
ROBERTS MOUNTAINS
ALKALI FLAT
DIAMOND VALLEY ALKALI FLAT
TABLE MOUNTAIN
BALD MTN 7586
WESTERN PEAK
ROBERTS CREEK MTN
DEVORE PEAK
TWIN SPRING HILLS
TABLE MTN
WHITE MTN
RICHMOND MTN
Windmill
Ranch
Corral
Hospital
Plant
Water
Reservoir
High Springs
Coils Creek
Cottonwood Can
Red Canyon
Dry Canyon
Meadow Canyon
Tenmile Summit
Bailey Pass
Eureka 5946
5767
5888
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R 53 E
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R 52 E
R 49 E
0 2 4 6 Miles
N
EXPLANATION
Project Area Boundary
Deer Corridors
DESIGN: EMLLC
DRAWN: GSL
REVIEWED: RFD
CHECKED:
APPROVED: RFD
DATE: 08/01/2012
FILE NAME: p1635_Fig3-23-1_DeerCorridors.mxd
BUREAU OF LAND MANAGEMENT
MOUNT HOPE PROJECT
DRAWING TITLE:
Deer Corridors in the Vicinity of the Mount Hope Project
Figure 3.23.1

Fisheries

Within the perennial drainages of the Roberts Mountains, recreational fisheries are present in Roberts Creek and Pete Hanson Creek. Fisheries may be present in other perennial drainages. NDOW data for 2010 on Roberts Creek document an average of 72.6 fish per mile for brook trout (*Salvelinus fontinalis*), 39.6 for rainbow trout (*Oncorhynchus mykiss*), and 13.2 for brown trout (*Salmo trutta*). An estimated 1,016.5 game fish existed along 5.5 miles of Roberts Creek. A ten-year study on Pete Hanson revealed an average of six anglers a day, ten days of fishing, and 85 fish caught per year. The same study on Roberts Creek averaged 17 anglers a day, 58 days of fishing, and 171 fish caught per year. A discussion of surface water resources (streams) is included in Section 3.2.2.3.1.

3.23.2.2.2 Special Status Wildlife Species

Greater Sage-Grouse

Greater sage-grouse is a candidate for listing under the ESA and on March 23, 2010, the USFWS's 12-month status review of the species determined that the species warrants the protection under the ESA. The listing of the greater sage-grouse at this time is precluded by the need to address higher priority species and the state and BLM are responsible for management of the species.

Greater sage-grouse are largely dependent on sagebrush for nesting and brood rearing and feed almost exclusively on sagebrush leaves during the winter. Greater sage-grouse are known to occur in foothills, plains, and mountain slopes where sagebrush meadows, and aspen, are in close proximity. Dense sagebrush overstory and an herbaceous understory of grasses are important to provide shade and security, and both new herbaceous growth and residual cover are important in the understory. Greater sage-grouse have specific habitat requirements to carry out their life cycle functions. Early spring habitat or breeding sites called "leks," are usually situated on ridge tops or grassy areas surrounded by a substantial brush and herbaceous component (Schroeder et al. 1999). Leks have less herbaceous and shrub cover than surrounding areas. In early spring males gather in leks where they strut to attract females.

The distribution of greater sage-grouse in Nevada is closely tied to the sagebrush ecosystem that provides nesting, brood, and fall/winter cover as well as forage throughout the year. Summer habitat consists of sagebrush mixed with areas of wet meadows, riparian, and irrigated agricultural fields. Fall habitat consists of mosaics of low-growing sagebrush and Wyoming big sagebrush. Winter habitat is contingent on the severity of winter weather, topography, and vegetative cover (NDOW 2004). Late spring habitat or nesting sites are located in thick cover in sagebrush habitat beneath sagebrush or other shrubs. Nests are situated on the ground in a shallow depression with an average distance between nest sites and nearest leks of 0.7 to 3.9 miles; however, females may move greater than 12.4 miles from a lek to nest (NatureServe 2010). Individual greater sage-grouse move seasonally between habitat types throughout the year.

The NDOW defines lek status as active, inactive, historic, or unknown. An active lek is defined as a lek that had two or more birds present during at least one of three or more visitations in a given breeding season. For a strutting ground to attain this status it must also have had two or more birds present during at least two years in a five-year period. An inactive lek is a lek that has

been surveyed three or more times during one breeding season with no birds detected during the visitations and no sign observed on the lek. If a lek is only visited once during a breeding season and was surveyed under adequate conditions and no birds were observed at the location during the current and the previous year and no sign was observed at the lek, then an inactive status can be applied to the lek. An unknown lek is a lek that may not have had birds present during the last visitation, but could be considered viable due to the presence of sign at the lek. This designation could be especially useful when weather conditions or observer arrival at a lek could be considered unsuitable to observe strutting behavior. The presence of a single strutting male would invoke the classification of the lek as unknown. A lek that was active in the previous year, but was inadequately sampled (as stated above) in the current year with no birds observed could also be classified as unknown. A historic lek is a lek that has not had bird activity for twenty years or more and has been checked according to protocol at least intermittently. Another means of classifying a lek as historic is to photograph a lek location and determine if the habitat is suitable for normal courtship displays. For example, if a lek location lies in a monotypic stand of sagebrush that is three to four feet tall, then conditions are no longer suitable for lekking activity.

The NDOW also designates a notice status for active, inactive, and unknown status leks. As a result of the number of documented lek locations in the State of Nevada and the limited personnel available to visit all leks each year, the status applied to a lek through its most recent visitation will be upheld in subsequent years until the lek is revisited to verify its status. These descriptions are the most current attempt at applying a definition to the status of a lek and are subject to change to compensate for any unforeseen scenarios. All the leks in Nevada have not yet had these classification applied to them; however, the NDOW is committed to standardizing lek status across regions and field verifying lek status over time.

An ongoing study is being conducted in relationship to the Falcon-Gondor transmission line and the effects on greater sage-grouse populations. The Falcon-Gondor line is approximately 180 miles long and has 735 towers that vary in height from 75.5 to 131 feet, depending on the topography. The path of the Falcon-Gondor line places it in the middle of Eureka County's prime greater sage-grouse habitat. The study site for the transmission line is located in central Nevada within Eureka County and is bounded by the Cortez and Simpson Park Mountains to the west and the Diamond and Sulphur Spring Mountains to the east. This area includes the Denay, Pine, Kobeh, Diamond, Horse Creek, Grass, and Garden Valleys. The study area encompasses approximately 2,500 square miles of sagebrush steppe and piñon-juniper mountain ranges with many ephemeral streams. The study area includes 74.6 miles of the Falcon-Gondor line and focuses on 13 active leks at various distances from the Falcon-Gondor line. Five of these leks have been monitored by the NDOW and BLM for the past thirty years. The Falcon-Gondor line crosses through the proposed Project Area and this region was the focus of the Roberts Creek greater sage-grouse population. The Cortez greater sage-grouse population was also studied. The most recent summary of the results of these studies indicate that there are substantial demographic differences between the Roberts Creek and Cortez populations, and suggest that greater sage-grouse in the Cortez Range are at higher risk. Variation in habitat conditions, driven at least in part by wildland fire, partially explain this variation for male survival and nest success, whereas variation in predator communities and challenges associated with reproduction may limit female survival. The greater sage-grouse population in the area monitored appeared to have stabilized in 2010, based on patterns in lek attendance and male capture-recapture estimates (Blomberg et al. 2010).

The greater sage-grouse trend in Eureka County is **as follows**. The peak male attendance at ten comparable areas surveyed in 2012 was **259** for an average of **25.9** males per ground. This resulted in a **25** percent increase from 2011 when **207** males were counted, for an average of **20.7** males per ground. The**re were** 41 males per **these same trend grounds in 2006** the highest average since 1986 when the average was 47 males. **In addition to trend counts there were additional leks monitored by the NDOW, BLM, and University of Nevada-Reno graduate students in 2012. These 18 leks monitored in 2012 had 346 males in attendance for an average of 19.2 males per lek. In 2011, these same leks had 307 males yielding an average of 17.1 males per lek for a twelve percent increase from 2011 to 2012. There were 21 active leks surveyed in the 3-Bar PMU in 2012 with 339 males for an average of 16.1 males per lek.** Greater sage-grouse are a USFWS candidate species, BLM sensitive species, NNHP watch species, and State of Nevada protected species (NRS 501). Individual greater sage-grouse counts can vary year to year and approximately ten years of data are required to establish population trends.

Potential greater sage-grouse habitat within the Project Area was surveyed and no active leks were identified within the area of proposed disturbance and no individual greater sage-grouse were observed (SRK 2007b). Although no leks have been identified within the Project Area, the BLM has recorded the following greater sage-grouse use in the Project Area: hens; nests; additional brood, hen, and lek locations are located near the well field corridor and near the powerline (Personal Communication, Duane Crimmins, BLM Biologist, April 4, 2008). One greater sage-grouse dropping was recorded in the northeast portion of the proposed well field in the Project Area. **Additionally, greater sage-grouse are known to inhabit Kobeh, Diamond, and Garden Valleys and the Roberts Mountains. Greater sage-grouse are known to move from Kobeh Valley to the Roberts Mountains during their life cycle.**

The BLM and NDOW have identified known greater sage-grouse leks within the vicinity of the Project Area (Figure 3.23.2). As illustrated on Figure 3.23.2, the area covers approximately 38 miles east-west and 21 miles north-south centered on the Project's well field. The figure illustrates **16** active leks, **12** historic leks, and 13 unknown leks. Four leks were surveyed by SRK and found to be active: the Pony Express Lek; Kobeh 8-1 Lek; Lone Mountain Lek; and Dome House Lek. **Following SRK's survey, the NDOW and BLM identified Henderson Pass and Roberts Creek #2 leks as active.**

The Pony Express Lek only had two greater sage-grouse present on the lek during the time of the survey. A third bird flushed upon approach, approximately 1,000 feet from the lek. The area adjacent to the lek was overgrown with Wyoming big sagebrush and the birds used the road to strut, since it was the only open feature in the vicinity (SRK 2007b). **The NDOW reported a peak male count of 11 in 2011 and 21 in 2012.**

The Kobeh 8-1 Lek was active with approximately 15 birds present. The lek was fairly typical of greater sage-grouse lek sites with open, low vegetation at the lek surrounded by taller shrub cover (SRK 2007b). **The NDOW reported a peak male count of 14 in 2011 and 15 in 2012.**

The Lone Mountain Lek was active with approximately 36 birds present. This lek was large with birds scattered over approximately 650 feet. The lek was on a ridge covered with low sagebrush and adjacent Wyoming big sagebrush (SRK 2007b). **The NDOW reported a highest single day male count of 30 in 2011 and 41 in 2012.**

The Dome House Lek was active with 25 to 30 birds present. The lek area was fairly small and relatively close to piñon-juniper trees (SRK 2007b). **The NDOW reported a peak male count of nine in 2011 and 12 in 2012.**

The Henderson Pass lek has also been identified as active by the BLM and was first documented in 2008 with 27 males in attendance, in 2009 with 16 males, and in 2010 with seven males. **The NDOW reported a peak male count of eight in 2011 and seven in 2012.**

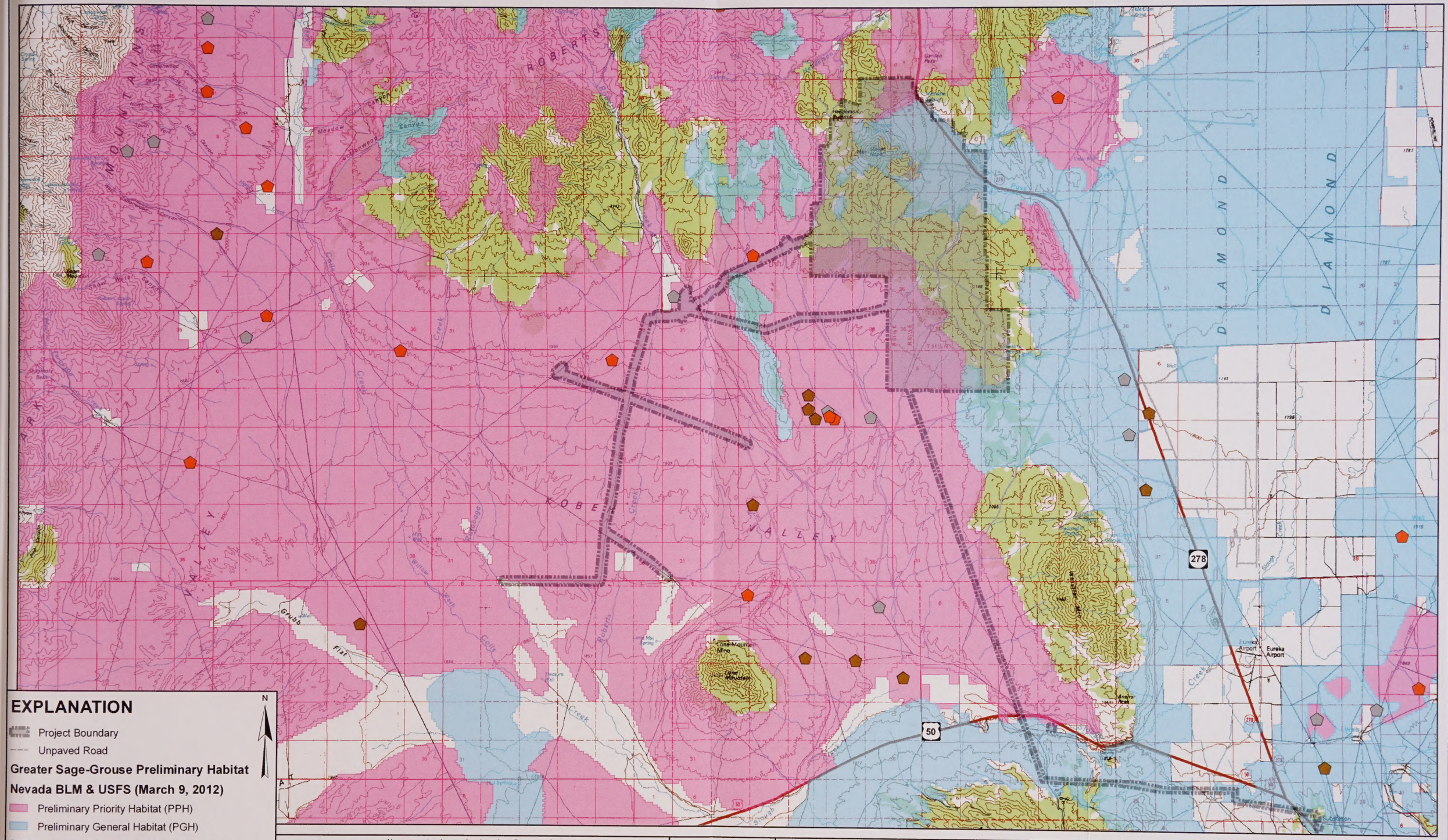
The Roberts Creek #2 lek is in an old crested wheatgrass (*Agropyron cristatum*) seeding that is dominated by Wyoming big sagebrush with very little open spaces preferred by greater sage-grouse for lekking. This lek has moved several times in the seeding over the years due to the change in vegetation. The peak male greater sage-grouse count at the Robert's Creek #2 lek is as follows: in 2006 it was 30; in 2007 it was 26; in 2008 it was nine; in 2009 it was nine; in 2010 it was five; in 2011 it was zero; and in 2012 it was two.

The highest single day lek attendance at the Pony Express Lek, Kobeh 8-1 Lek, Lone Mountain Lek, Dome House Lek, and Henderson Pass Lek were recorded in the most recent Falcon-Gondor Study and are summarized in Table 3.23-1 (Blomberg et al. 2010). The cyclic nature of greater sage-grouse populations is illustrated in Table 3.23-1 as lek attendance dropped in 2007. To date, there has not been a recovery to pre-2007 numbers and the effects to these leks as a result is not known. Results from the 2010 study indicate that male attendance in the Horse Creek, Pinefield, Pony Express, Lone Mountain, and Kobeh Leks have decreased from approximately 60 to 30 between 1970 and 2010; however, male attendance in these leks has been relatively stable at approximately 30 since 2000.

Table 3.23-1: Highest Single Lek Attendance for Each Lek by Sex and Year from the Falcon-Gondor Study

Year	Lek									
	Pony Express		Kobeh 8-1		Lone Mountain		Dome House		Henderson Pass	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
2003	14	1	14	5	32	3	15	1	-	-
2004	11	1	10	3	33	7	17	5	-	-
2005	15	1	12	2	50	17	28	4	-	-
2006	15	6	54	4	63	11	47	5	-	-
2007	10	3	6	1	56	14	22	3	-	-
2008	6	1	7	1	34	12	23	8	27	8
2009	8	0	6	2	22	6	12	5	16	6
2010	0	0	9	7	17	2	17	1	7	3

The BLM has issued two IMs for the protection of greater sage-grouse. IM 2012-043, Greater Sage-Grouse Interim Management Policies and Procedures, provides interim policies and procedures to the BLM to be applied to ongoing and proposed authorizations that affect greater sage-grouse, while long-term permanent measures are being developed (BLM 2011b). IM 2012-044, BLM National Greater Sage-Grouse Land Use Planning Strategy, provides direction to the BLM for the consideration of conservation measures, identified in A Report on National Greater Sage Grouse Conservation Measures prepared by the Sage-Grouse National Technical Team, to apply during the land use planning process (BLM 2011c). The NDOW has recently mapped greater sage-grouse habitat in Nevada to support these IMs and published a Habitat Characterization Map in



EXPLANATION

- Project Boundary
- Unpaved Road

Greater Sage-Grouse Preliminary Habitat
Nevada BLM & USFS (March 9, 2012)

- Preliminary Priority Habitat (PPH)
- Preliminary General Habitat (PGH)

2012 Greater Sage-Grouse Lek Status

- Active
- Historic
- Unknown

N

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0 1 2 3 4 5 6 7 Miles

IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

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DESIGN:	EMLLC	DRAWN:	CVD/GSL	REVIEWED:	RFD
CHECKED:	-	APPROVED:	RFD	DATE:	08/01/2012

FILE NAME: p1635_Fig3-23-2_SageGrouse.mxd

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Greater Sage-Grouse Leks and Distribution

Figure 3.23.2

March 2012. The BLM used this NDOW map to create a map identifying Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH) on BLM administered lands. According to this map, there are approximately 9,027 acres of PPH located within the Project Area and approximately 4,173 acres of PGH located within the Project Area.

Migratory Birds and Raptors

The following raptors (also migratory birds) or their sign were observed in or near the Project Area: Cooper's hawk (*Accipiter cooperii*); ferruginous hawk (*Buteo regalis*); golden eagle; prairie falcon (*Falco mexicanus*); and kestrels (*Falco sparverius*) (SRK 2007b) (Figure 3.23.3). It is possible that other species of raptors not mentioned may utilize the Project Area.

Two raptor nests were located in the Project Area. A Cooper's hawk was observed on the west side of Mount Hope during the aerial survey. The hawk nest was observed in subsequent field work in the southwest 1/4 of Section 1, T22N, R51E. A ferruginous hawk nest was also observed in the Project Area. A pair of ferruginous hawks was observed on April 28, 2006, in Section 20, T22N, R52E, near Tyrone Creek. The male was flushed from the ground and the female was observed in a nearby piñon tree on the nest (SRK 2007b).

Steep and extensive rock ledges are located at the eastern edge of the Project Area. This rock formation was the site of many inactive raptor nests. Just east of the Project Area boundary in the same rock formation, two active prairie falcon nests were located. Kestrels, which normally nest in tree cavities or crevices within rock ledges, were also observed in this rock formation. Although it is likely that kestrel nests were present in the rock formation east of the Project Area, specific locations could not be determined at the time of the survey (SRK 2007b).

Golden eagle nesting habitat is located in the rock ledges found east of the Project Area (SRK 2007b). Three golden eagle nests are located within ten miles of the Project Area. SRK located an active golden eagle nest approximately 1.25 miles east of the Project Area boundary and three miles from Project activities in Section 22 (SRK 2007b). This nest is located on the east side of the ridge, approximately 40 to 60 feet below the ridgeline (i.e., facing Diamond Valley and away from Project activities). SRK also located an inactive golden eagle nest approximately 1.5 miles east of the Project Area in Section 27. This nest is also located on the east side of the ridge and more than 60 feet below the ridgeline. The NDOW identified an active nest approximately 8.4 miles southeast of the Project Area. Golden eagle foraging habitat is found throughout the Project Area (SRK 2007b).

No nests were observed on the Falcon-Gondor Power Transmission Line towers. This line was constructed with materials designed to discourage nesting by raptors and ravens (*Corvus corax*). Although a red-tailed hawk (*Buteo jamaicensis*) was observed perched on a cross bar, and the whitewash typical of raptor perch sites was common on many of the powerline poles, no nests were observed (SRK 2007b).

A number of migratory birds that breed in North America and winter in the neotropical region of South America also breed in the Project Area and vicinity. Species commonly occurring in piñon-juniper habitats include the piñon jay (*Gymnorhinus cyanocephalus*), gray flycatcher (*Empidonax wrightii*), mountain bluebird (*Sialia currucoides*), western bluebird (*Sialia mexicana*), Virginia's warbler (*Vermivora virginiae*), and Scott's oriole (*Icterus parisorum*) have the potential to occur in the Project Area. Other species such as the sage thrasher (*Oreoscoptes*

montanus), sage sparrow (*Amphispiza belli*), loggerhead shrike (*Lanius ludovicianus*), and black rosy finch (*Leucosticte atrata*) have potential to occur in the sagebrush habitats in the Project Area (SRK 2007b). Green-tailed towhee (*Pipilo chlorurus*) also has the potential to occur in the sagebrush habitat in the Project Area (NDOW Public Scoping Comments, March 16, 2007). The piñon jay, loggerhead shrike, and black rosy finch are also BLM sensitive species.

Common nighthawk (*Chordeiles minor*) and common raven *(Corvus corax)* were observed in the survey of the Kobeh Valley portion of the Project Area (Great Basin Ecology 2008). The following migratory birds are located in Kobeh Valley and have the potential to occur in the Project Area: black-throated gray warbler (*Dendroica nigrescens*), black-throated sparrow (*Amphispiza bilineata*), Brewer's sparrow (*Spizella passerina*), lark sparrow (*Chondestes grammacus*), and western meadowlark (*Sturnella magna*) (Great Basin Ecology 2008). It is likely that there are some migratory bird species not mentioned here that may utilize the Project Area for nesting or foraging.

Pygmy Rabbits

The Project Area and vicinity contains suitable habitat for occupation by pygmy rabbits. Known pygmy rabbit locations and previously occupied habitat are shown on Figure 3.23.3. The pygmy rabbit is a BLM sensitive, NNHP watch, and State of Nevada protected species. Pygmy rabbits are often found in dense big sagebrush and rubber rabbitbrush areas. Such vegetation is associated with deeper soils, which is an important component of pygmy rabbit habitat, occur in many areas on the alluvial fans located in the Project Area. Nineteen burrows and ten pygmy rabbits were documented during the surveys conducted on August 3, 4, and 18, 2006, in the proposed mine portion of the Project Area. The majority of the sightings and burrow locations occurred along the old railroad grade that parallels SR 278 to the west. The deep soil embankments along with the railroad timbers provided necessary structure and vegetation for pygmy rabbits to thrive. Burrows or pygmy rabbits were found along the entire length of the historical structure. Numerous sightings and burrow complexes were located along the alluvial fan east of Mount Hope Spring. These areas were vegetated by tall (i.e., greater than four feet in height) dense big sagebrush and rubber rabbitbrush and contained adequate understory for cover and forage (SRK 2007b).

Additionally, one isolated colony of pygmy rabbits was located in the southern portion of the Project Area surveyed in 2006. This colony was located within a small island of basin big sagebrush. The height of the shrubs exceeded four feet within the piñon-juniper vegetation type. The site was typical for pygmy rabbits except for the surrounding piñon-juniper trees and small size of the sagebrush island (SRK 2007b).

The proposed transmission line corridor is located adjacent to U.S. Highway 50 and extends north toward the Project Area. The corridor contains suitable pygmy rabbit habitat. Pygmy rabbit habitat within the proposed transmission line corridor consists of a length of approximately 0.76 mile of occupied habitat, 1.37 miles of potential habitat, and 1.95 miles of previously occupied habitat (SRK 2007c).

During the survey of the proposed well field in Kobeh Valley on July 1 and 2, 2008, pygmy rabbits were observed in three areas. One occupied site was located in the Wyoming big sagebrush vegetation type in higher elevations and the two other sites were located in basin big sagebrush associated with drainages. Additional unoccupied areas in Kobeh Valley were

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SP-2A
SP-2
SP-3
PAG WRDF
SP-1
SP-4
LGO STOCKPILE
Non-PAG WRDF
SP-5
MOUNT HOPE OPEN PIT
SP-6
SP-7
Cyclone Facility
To Well Field
To Well Field
Barge

T23NR50E
T23NR51E
T23NR52E
T22NR50E
T22NR51E
T22NR52E
T22NR53E
T21 1/2NR51E
T21 1/2NR52E
T21 1/2NR53E
T21NR50E
T21NR51E
T21NR52E
T21NR53E
T20NR51E
T20NR52E
T20NR53E
T19NR52E
T19NR53E

EXPLANATION

- Project Area Boundary
- Falcon-Gonder Power Line
- Power Line Reroute
- Existing Power Line
- TSF/Mine Power Line
- 230-kV Power Line
- Access Road
- Haul Road
- Light Vehicle Road
- Growth Media Stockpile Access Road
- BLM Wire Fence
- WildLife Fence
- Diversion Channel
- Collection Channel
- Reclaim Line
- Tailing Line
- Well Field Water Line
- Well Field Power Line
- Drop Structure
- Tailing Corridor
- Buildings/Structures
- Growth Media Stockpile
- Interpit Area
- Pond
- Low Grade Ore Stockpile
- Sediment Control Structure
- Tailing Storage Facilities
- Waste Rock Disposal Facilities
- Yards
- Landfill Location
- Spring

N

Pygmy Rabbit Habitat Observations

- Occupied
- Potential

Raptor Nests

- Cooper's Hawk
- Burrowing Owl
- Ferruginous Hawk
- Golden Eagle
- Prairie Falcon

0 1 2 3 Miles

DESIGN: EMLLC	DRAWN: GSL	REVIEWED: RFD
CHECKED: -	APPROVED: RFD	DATE: 08/01/2012
FILE NAME: p1635_Fig3-23-3_PygmyRabbitsRaptors.mxd		

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Pygmy Rabbit and Raptor Observations within the Mount Hope Project Area

Figure 3.23.3

identified as suitable pygmy rabbit habitat, which were associated with ephemeral drainages where basin big sagebrush grew between ridges of low sagebrush (Great Basin Ecology 2008).

Burrowing Owls

Burrowing owls breed throughout the western U.S. in open grassland areas. In northern Nevada, the burrowing owl occurs as a summer breeder and migrates south during the winter (Herron et al. 1985). Burrowing owl breeding sites are strongly dependent on the presence of burrows constructed by prairie dogs, ground squirrels, or badgers. Prime burrowing owl habitat must be open, have short vegetation, and contain an abundance of burrows.

Burrowing owl habitat is located in the Kobeh Valley portion of the Project Area; however, none of the burrows examined during the field survey exhibited signs of recent use by burrowing owls (Great Basin Ecology 2008). Burrowing owls are a BLM sensitive species, NNHP watch species, and State of Nevada Protected Species.

Yellow-billed Cuckoo

The yellow-billed cuckoo is a candidate for listing as threatened or endangered west of the Rocky Mountains. Available data suggest that the yellow-billed cuckoo's range and population numbers have declined substantially across much of the western U.S. over the past 50 years (USFWS 2001). Habitat continuity is an important landscape feature for yellow-billed cuckoos. Unfragmented riparian woodland patches of at least 50 acres have been suggested to meet minimal habitat requirements in California populations, although occupancy of patches this small was estimated at less than ten percent (Laymon 1998). More suitable habitat consists of unfragmented riparian woodland patches of 100 acres or larger. Suitable breeding habitat for yellow-billed cuckoos consists of healthy shrub thickets, multi-aged riparian woodland stands, wet meadows, and open water (GBBO 2005). Threats to the yellow-billed cuckoo have been identified following loss or degradation of riparian habitat from human activities including agricultural development, river flow management, stream alterations, and livestock grazing (USFWS 2001). Yellow-billed cuckoos nesting west of the Continental Divide occur almost exclusively close to water, and biologists have hypothesized that the species may be restricted to nesting in moist river bottoms because of humidity requirements for successful hatching and rearing of young (Hamilton and Hamilton 1965; Rosenberg et al. 1991).

Riparian thicket habitat is nonexistent within the Project Area. No yellow-billed cuckoos were observed during the field surveys of the Project Area (SRK 2007b). Riparian thicket habitat does exist adjacent to perennial stream in the Roberts Mountains; however, this habitat is very limited in extent (less than 50 acres).

Bats

Several bat species have the potential to occur within the Project Area. The historic underground mine workings serve as potential habitat for bats. The survey conducted in the Project Area found hibernation habitat for small-footed myotis (*Myotis ciliolabrum*), a BLM sensitive species and NNHP watch species, and Townsend's big-eared bat (*Corynorhinus townsendii*), a BLM sensitive species, NNHP at-risk species, and State of Nevada protected species. The most notable use was documented in the largest and most complex of the mines within the Project Area, the Mount Hope Mine. Cold season use by bats of other workings in the Project Area was relatively

low. Virtually all mines in the Project Area experienced some warm season use. Evidence of extensive summer habitat for Townsend's big-eared bat was located in the Mount Hope Mine. Evidence of maternity use was documented in portions of the Mount Hope Mine closely associated with Adit 9. Additionally, the distribution of Townsend's big-eared bat guano in the Lorraine Mine suggests that this or another maternity colony utilizes these workings (Sherwin 2007).

3.23.2.2.3 Special Status Fish Species

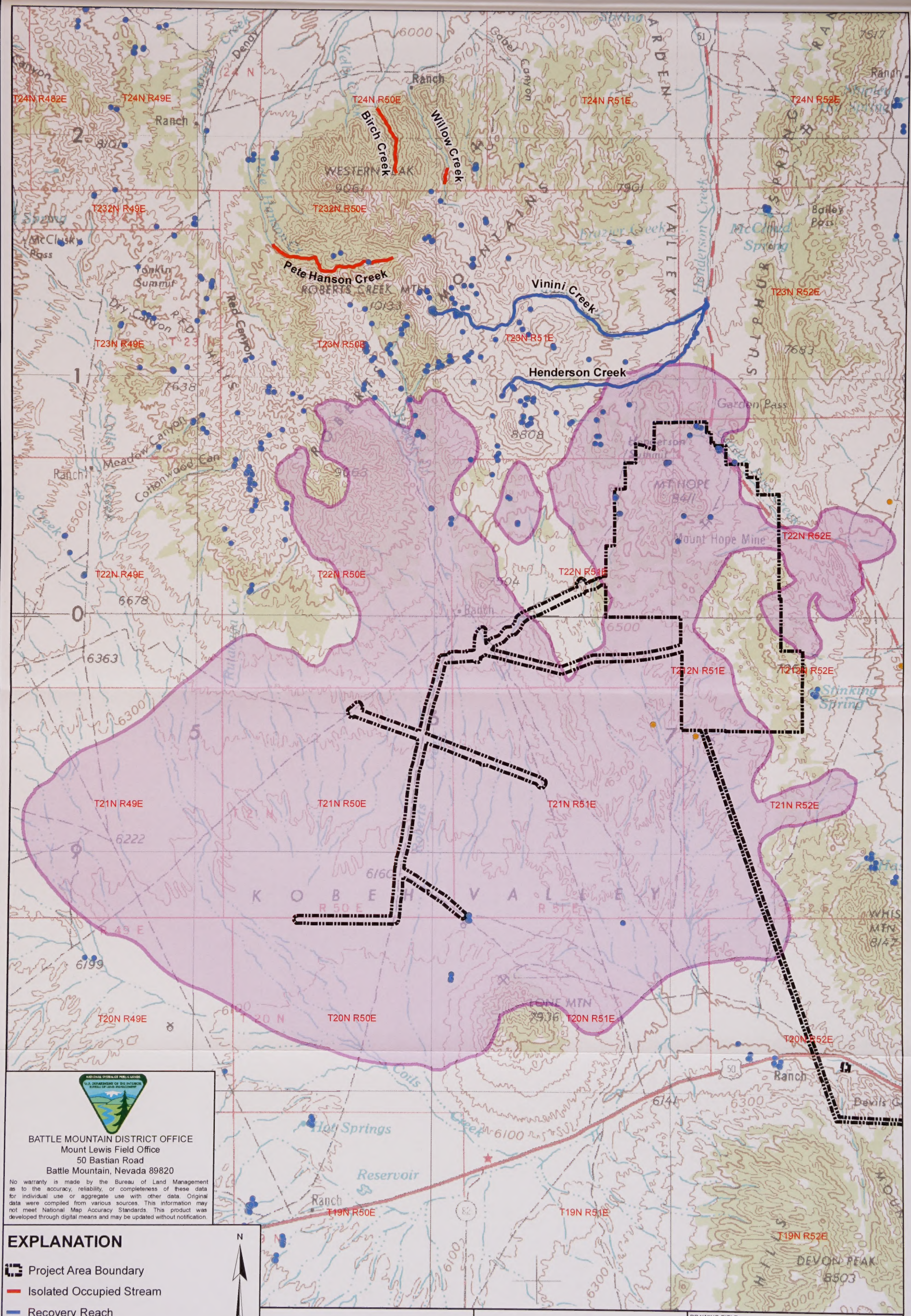
Lahontan Cutthroat Trout

Lahontan cutthroat trout (LCT) is the only ESA-listed species of potential concern under consideration as a result of the proposed Project. LCT were originally listed as endangered under the ESA on October 13, 1970 (35 FR 16047-16048), then reclassified as threatened on July 16, 1975, under the ESA to facilitate management and allow regulated angling (40 FR 29863-29864). The Recovery Plan for LCT was approved on January 30, 1995.

LCT is an inland subspecies of cutthroat trout (family Salmonidae). The species may be either riverine or lacustrine and are endemic to the Lahontan Basin of northeast California, southeast Oregon, and northern Nevada. The range for LCT in Nevada includes the Truckee, Carson, Walker, Quinn, and Humboldt River basins, the Honey and Coyote Lake basins, and Black Rock Desert basin. A portion of the Project Area, and a portion of the wildlife study area falls within the Humboldt River basin, which is the basin that supports the greatest number of fluvial LCT populations (USFWS 1995). The Humboldt River basin is broken up into subbasins. A portion of the wildlife study area is located within the Pine Creek subbasin. Within the Pine Creek subbasin, there are two streams, Birch Creek and Pete Hanson Creek, with five miles of occupied habitat and two streams, Henderson Creek and Vinini Creek, with 15.6 miles of potential habitat (seven and 8.6 miles respectively) for this species with no metapopulation potential (Figure 3.23.4).

Riverine, or stream-dwelling, LCT usually live less than five years and may reach ten to 15 inches in length. Females mature at three to four years of age and males at two to three years of age (USFWS 1995). As with all cutthroat trout, the LCT is an obligate riverine spawner. Spawning occurs from April to July, depending on discharge, elevation, and water temperature. Spawning and nursery habitat is characterized by cool water, pools in close proximity to instream cover, velocity breaks, well-vegetated and stable streambanks, and relatively silt-free rocky substrate in riffle-run areas (USFWS 1995). This species spawns in riffles over gravel substrate when water temperatures are between 41 to 60 ˚F. Intermittent tributaries are sometimes used as spawning sites during high-water years. Fry may develop in the tributary stream until flushed into the mainstream during high runoff (Coffin 1981; Trotter 1987).

General characteristics of riverine cutthroat habitat include a relatively stable flow regime, a 1:1 pool to riffle ratio, well-vegetated stable streambanks, instream cover exceeding 25 percent, and relatively silt-free riffle-run areas. Cutthroat trout waters generally have a stable summer temperature regime with less than 39 ˚F fluctuation in water temperature and maximum water temperatures less than 72 ˚F (Hickman and Raleigh 1982). LCT may have a higher thermal tolerance than other cutthroat trout and can tolerate temperatures exceeding 80 ˚F for short periods of time and 57 to 63 ˚F fluctuations of temperature (Coffin 1983; Dickerson and Vinyard 1999). Beaver ponds may provide thermal refuge for trout in the summer and winter.



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EXPLANATION

- Project Area Boundary
- Isolated Occupied Stream
- Recovery Reach
- Spring/Seep
- Well
- 10-foot Drawdown Contour Maximum Extent

N

0 1 2 3 4 Miles

DESIGN: EMLLC	DRAWN: GSL	REVIEWED: RFD	
CHECKED: -	APPROVED: -	DATE: 08/24/2012	
FILE NAME: p1635_Fig3-23-4_LCT_Habitat.mxd			

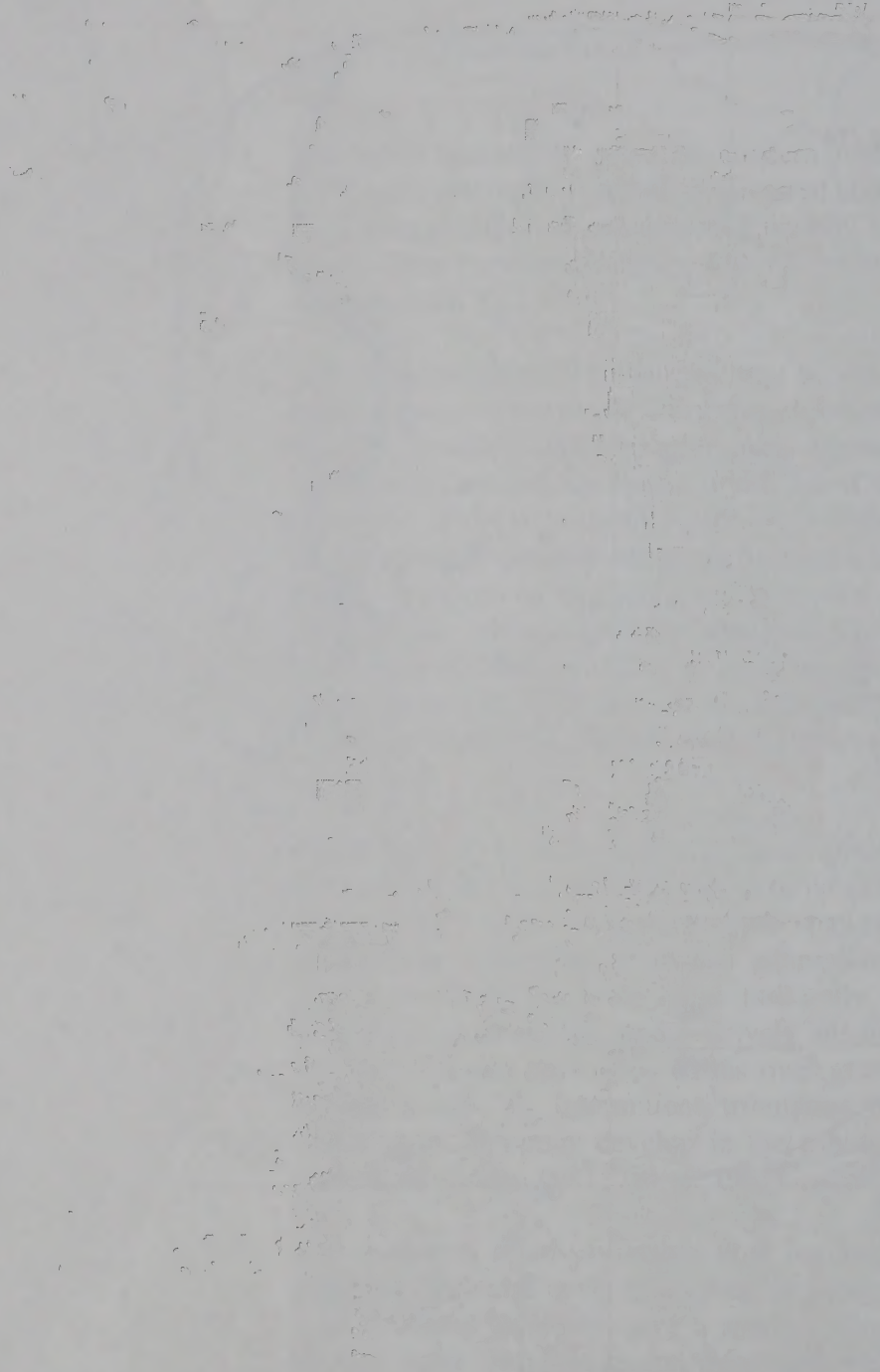
BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Lahontan Cutthroat Trout Occupied Habitat and Recovery Areas

Figure 3.23.4



Habitat requirements may vary somewhat with life stage and season (USFWS 1995). LCT primarily feed on terrestrial and aquatic invertebrates, although larger fish may be picivorous (fish eating).

The decline of LCT has been primarily attributed to the loss and degradation of habitat. Agricultural and municipal uses of water from streams or lakes have reduced or altered the stream discharge in habitat for this species. Livestock and wild horse grazing have altered the physical characteristics of stream channels and increased the sediment loads in many LCT streams. Mining, urban development, logging, road construction, and dam building have also been associated with changes in stream channel morphology and water quality (USFWS 1995; NDOW 2004).

LCT compete with or are displaced by nonnative trout species that were historically stocked for recreational fishing opportunities. Dunham and Vinyard (1996) found that the distribution of LCT can be truncated when brook trout are present, although they noted that the results were variable. Furthermore, LCT have hybridized with nonnative rainbow trout in many areas (USFWS 1995; NDOW 2004).

LCT conservation efforts are ongoing and involve fish transplants, population and habitat surveys, genetic evaluations, habitat improvement projects, new grazing practices, use of riparian fencing, and the creation of fishery management plans for several basins. The objective of these management efforts is the protection or restoration of habitats that sustain viable self-sustaining populations of this species. A self-sustaining population is defined as having been established five or more years and having three or more age classes (USFWS 1995).

The USFWS has recommended an ecosystem management approach for the conservation of this species with a streamside management zone that includes the green line and riparian areas (USFWS 1995). Even in areas where LCT populations have declined, annual year class production is highly variable and the species has the capability of responding to improved environmental conditions with rapid increases in abundance (Platts and Nelson 1983; 1988). Site-specific opportunities may exist to improve the status of LCT, including mitigation for permitted land use activities (NDOW 2004).

Status within the Pine Creek Subbasin

The Pine Creek subbasin contains two creeks, Birch Creek and Pete Hanson Creek, with LCT occupying approximately five miles of habitat (NDOW 2004) (Figure 3.23.4). These creeks are isolated occupied streams as identified by the NDOW (i.e., LCT is present in these isolated stream segments of larger river systems with no opportunity for natural recolonization) (USFWS 1995). Both Birch Creek and Pete Hanson Creek currently support LCT (NDOW 2009a). Birch Creek is located on the northeastern flank of Western Peak approximately 10.5 miles northwest of the Project. Pete Hanson Creek is located on the northwest side of Roberts Mountains approximately eight miles northwest of the Project. In the summer of 2011, the NDOW located a population of LCT in Willow Creek which is located east of Birch Creek and northeast of the Project Area (Personal Communication, Ryan Sandefur, September 23, 2011).

Birch Creek originates from the north side of Cooper Peak at approximately 8,200 feet amsl in the Roberts Mountains from four separate springs along three different reaches. Birch Creek flows north until it reaches the valley floor at 6,400 feet amsl where it is diverted for agriculture.

The first fish population survey was conducted in 1957 and subsequent surveys occurred in 1984, 1998, 2003 (NDOW 2003a), and 2009 (NDOW 2009a). During the 1957 survey, two stations were electroshocked and what was believed to be cutthroat trout/rainbow trout (*Oncorhynchus mykiss*) hybrids were found at an average population of 95.9 fish per mile. The stream had last been stocked with trout in 1952; however, the numbers and species were not reported. An intensive habitat and fish population survey conducted in 1984 found what was thought to be cutthroat trout/rainbow trout hybrids at four stations (191.4 fish per mile average) and rainbow trout at two stations (184.8 fish per mile average). Four age classes were represented in the hybrid sample while three age classes were found in the rainbow trout sample; however, post-1984 genetic sampling found those hybrids to be pure LCT (NDOW 2009a).

Both of these surveys questioned whether the fish sampled were actually hybrids. The origin of LCT found in Birch Creek is not known. In 1988 ten fish were sampled and collected for biochemical genetic analysis. The sample found that the fish were pure LCT (Bartley and Gall 1989). It is not known if the fish were stocked in the early 1900s or if the fish are descendants from cutthroat trout native to the Pine Creek drainage. Further, in 2003, LCT from Birch Creek were sampled to identify the probable origin of transplanted populations and to assess the degree of introgression in other populations. Phylogenetic analysis of Birch Creek LCT found that they clustered most closely with East Fork Carson River populations (Peacock 2003). Peacock (2003) also noted evidence of multiple source populations and significant genetic barriers in the Birch Creek population of LCT; however, Peacock also states that sampling is incomplete and phylogenetic relationships can easily be influenced by incomplete sampling.

In 1998, LCT occupied approximately 1.5 miles of Birch Creek with an average population of 153.2 fish per mile. The ratio of adult to sub-adult was 26 percent to 74 percent. The total population including young-of-year was 229.9 and the fish caught ranged from fair to excellent body condition (NDOW 2009b).

The NDOW (2003a) reported that the 2003 electrofishing survey was comparable to the 1984 and 1998 surveys for occupied habitat (1.5 miles), number of age classes (three age classes), and ratio of adult to sub-adult (46.7 percent/53.3 percent). Ocular estimation of habitat conditions on the survey ranged from fair to excellent with the lack of quality pools and cemented substrate being limiting factors (NDOW 2003a). In 2003, LCT had an average population of 198.0 fish per mile (NDOW 2009a).

The most recent fish population survey of Birch Creek was conducted in July 2009. LCT occupy approximately 1.9 miles of Birch Creek at an average population of 116.2 fish per mile. There were two age classes and the ratio of adult to sub-adult is 18 percent to 82 percent. The total population including young-of-year was 220.8 and all of the fish caught were considered to be in good body condition (NDOW 2009b).

Pete Hanson Creek originates south of Western Peak, on the southwest side of Cooper Peak at approximately 7,200 feet amsl in the Roberts Mountains. Pete Hanson Creek flows northwest until reaching the valley floor where it is diverted for agriculture. The first fish population survey was conducted in 1957 and subsequent surveys occurred in 1984, 1998, and 2003 (NDOW 2003b).

The first fish population survey of Pete Hanson Creek occurred in 1957. Three stations were electroshocked below a 20 to 25 foot waterfall that occurs in the upper portion of the creek.

Although no fish were found during this survey, it was estimated that there was 2.4 miles of suitable fish habitat below the waterfall. It was also noted that brook trout had been stocked in 1918 and rainbow trout in 1952. In November of 1983, 55 LCT were taken from Shoshone Creek (Big Smokey Valley Drainage) and stocked above the waterfall. The Shoshone Creek LCT had originally come from Kingston Creek (via Washington Creek of the Reese River Drainage) around 1895. In 1978, the Shoshone Creek fish were analyzed and found to be pure LCT. A more intensive habitat and fish population survey of Pete Hanson Creek conducted in 1984, found LCT at an estimated population of 184.8 fish per mile with an occupied range of one-half-mile.

In 1998, LCT occupied approximately 3.5 miles of Pete Hanson Creek with an average population of 381.7 fish per mile. The ratio of adult to sub-adult was 40 percent to 60 percent. The total population including young-of-year was 1,335.8 and the fish caught were all in good body condition (NDOW 2009b).

In 2003, LCT were found at all but the lowermost stations with an average population of 823.0 fish per mile (excluding young-of-year) and had an estimated occupied range of 3.5 miles. All fish were considered to be in fair to excellent body condition. The results of this survey are very comparable to what was found in 1998. The only difference found was in the fish per mile figures. The 1998 survey had an average of 381.7 fish per mile, while the 2003 survey had an average of 823.0 fish per mile. All other population parameters (occupied habitat, number of age classes, ratio of adult to sub-adult) were very similar. This population has occupied the majority of the available habitat in Pete Hanson Creek (NDOW 2009a). Ocular estimation of habitat conditions on the survey ranged from fair to good with the lack of quality pools and moderate amounts of sedimentation being the limiting factors (NDOW 2003b).

The most recent fish population survey of Pete Hanson Creek was conducted in July 2009. LCT occupy approximately 3.5 miles of Pete Hanson Creek at an average population of 445 fish per mile. There were five or more age classes and the ratio of adult to sub-adult is 34 percent to 66 percent. The total population including young-of-year was 1,558 and all of the fish caught were considered to be in good body condition (NDOW 2009b). When estimates are adjusted for the high rate of miss (number of fish caught was 30 and 29 were missed), the new estimates reflect 580 fish per mile and a total population estimate of 2,032.8 fish.

Willow Creek originates at approximately 7,800 feet on the north side of Roberts Mountain and flows to approximately 6,200 feet in Denay Valley, where the water is used for irrigation. Willow Creek was last surveyed by the BLM in 1984. During this survey no fish were found. Rubble and gravel sized materials were the dominant substrate and few quality pools were observed. Livestock utilization mostly occurred in the upper portions of the drainage. In 2009, a hydrologist with the BLM reported observing trout in the middle portions of Willow Creek during a PFC survey. In 2011, the NDOW conducted a survey and found LCT at survey station S7 at an average density of 105.6 fish/mile. LCT averaged 6.1 inches, with a range of 7.3 to 9.6 inches. All fish were considered to be in good to excellent body condition. While spot-shocking between stations, seven LCT were found within 200 feet upstream of survey station S6, and six LCT were found within 150 feet upstream of S7. These fish represented at least three different age classes, with one young-of-year present. The LCT population of Willow Creek appears to be healthy and has occupied a majority of the suitable habitat (NDOW 2011).

Trout Creek, Henderson Creek, and Vinini Creek are listed as possible recovery creeks for LCT in the Pine Creek subbasin (USFWS 1995). Trout Creek is located on the western flank of the Piñon Range approximately 43 miles north of the Project. Trout Creek had a remnant population of LCT in 1980; however, a subsequent survey in 1984 found only rainbow trout, brook trout, and possible hybrids. In 1999 a range fire destroyed the majority of the Trout Creek watershed and the riparian area along Trout Creek (NDOW 2004). As a result of the significant distance and separation from Trout Creek to the Project, Trout Creek is not further analyzed.

Henderson Creek has a tributary that originates in the northern portion of the Project Area (Figure 3.23.4). Henderson Creek is located approximately one mile north of the Project and originates at approximately 7,830 feet amsl. Henderson Creek flows northeast, then north where it reaches the confluences of Pine Creek at approximately 5,415 feet amsl. Vinini Creek is located approximately 2.5 miles north of the Project and originates at approximately 9,180 feet amsl. Vinini Creek flows east until it reaches the confluence of Henderson Creek at approximately 6,420 feet amsl. The most recent NDOW survey completed in Henderson Creek on June 5, 2007, found no LCT or trout.

Stream Riparian Assessment Data

Riparian assessments were conducted by the NDOW in 2001 for Birch Creek and Pete Hanson Creek to assess the riparian zones ability to dissipate stream energy, protect stream banks, and minimize erosion. Assessing the functioning condition of a stream involves qualitatively analyzing channel morphology, hydrologic, soil, and vegetative parameters to determine a rating. The rating system ranges from PFC to Functional at Risk (FAR) - Upward Trend (FAR-UP), Trend Not Apparent (FAR-NA), Downward Trend (FAR-DN), Non-Functional (NF), and Dry/Intermittent (DRY/INT). Technical Reference Series 1737 developed by the BLM, NRCS, and the USFS explains the methodology of the riparian PFC assessments. Tables 3.23-2 through 3.23-5 below summarize the riparian assessments conducted in 2001 for Birch Creek and Pete Hanson Creek.

Table 3.23-2: Stream Riparian Assessment Data from 2001 for Birch Creek

Stream Resources for Birch Creek Watershed							
Site Name	Riparian Functioning Condition Rating						Total Miles
	PFC	FAR-UP	FAR-NA	FAR-DN	NF	DRY/INT	
Birch Creek E. Trib. 1	0.00	0.00	0.00	0.44	0.00	0.00	0.44
Birch Creek R01	0.00	0.00	0.00	0.00	0.00	0.31	0.31
Birch Creek R02	0.33	0.00	0.00	0.00	0.00	0.00	0.33
Birch Creek R03	0.37	0.00	0.00	0.00	0.00	0.00	0.37
Birch Creek R04	0.00	0.00	0.00	0.00	0.00	1.92	1.92
Birch Creek R04	0.00	0.00	0.00	0.00	0.00	1.17	1.17
Birch Creek R05	0.00	0.00	0.00	0.00	0.00	0.85	0.85
Total	**0.70**	**0.00**	**0.00**	**0.44**	**0.00**	**4.25**	**5.38**

Table 3.23-3: Stream Riparian Assessment Data from 2001 for Birch Creek Springs

Stream Resources for Birch Creek Watershed						
Site Name	Riparian Functioning Condition Rating					Total Acres
	PFC	FAR-UP	FAR-NA	FAR-DN	NF	
Birch Creek Spring 1	0.00	0.10	0.00	0.00	0.00	0.10
Birch Creek Spring 1a	0.00	0.01	0.00	0.00	0.00	0.01
Birch Creek Spring 2	0.00	0.00	0.05	0.00	0.00	0.05
Birch Creek Spring 3	0.00	0.00	0.00	0.27	0.00	0.27
Total	**0.00**	**0.11**	**0.05**	**0.27**	**0.00**	**0.43**

Table 3.23-4: Stream Riparian Assessment Data for Pete Hanson Creek

Stream Resources for Pete Hanson Creek Watershed							
Site Name	Riparian Functioning Condition Rating						Total Miles
	PFC	FAR-UP	FAR-NA	FAR-DN	NF	DRY/INT	
Pete Hanson S. Fork (2006)	0.79	0.00	0.00	0.00	0.00	0.00	0.79
Pete Hanson S. Fork (2006)	0.90	0.00	0.00	0.00	0.00	0.00	0.90
Pete Hanson R1 (2006)	0.00	0.38	0.00	0.00	0.00	0.00	0.38
Pete Trib 2 (2008)	1.15	0.00	0.00	0.00	0.00	0.00	1.15
Pete Hanson (2009)	0.18	0.00	0.00	0.00	0.00	0.00	0.18
Pete Hanson 1 (2008)	1.75	0.00	0.00	0.00	0.00	0.00	1.75
Pete Hanson 2 (2008)	0.51	0.00	0.00	0.00	0.00	0.00	0.51
Pete Hanson 3 (2008)	0.00	1.18	0.00	0.00	0.00	0.00	1.18
Pete Hanson Creek R11	0.00	0.00	0.15	0.00	0.00	0.00	0.15
Pete Hanson Creek R12	0.00	0.00	1.19	0.00	0.00	0.00	1.19
Pete Hanson Creek R13	0.00	0.00	0.00	0.00	0.00	1.31	1.31
Total	**5.28**	**1.56**	**1.34**	**0.00**	**0.00**	**1.31**	**9.49**

Table 3.23-5: Stream Riparian Assessment Data from 2001 for Pete Hanson Creek Springs

Stream Resources for Pete Hanson Creek Watershed						
Site Name	Riparian Functioning Condition Rating					Total Acres
	PFC	FAR-UP	FAR-NA	FAR-DN	NF	
Pete Hanson Creek Spring Complex	0.00	0.00	0.00	1.88	0.00	1.88
Total	**0.00**	**0.00**	**0.00**	**1.88**	**0.00**	**1.88**

Stream riparian assessment data from 2001 for Birch Creek stream data indicate that of the 5.38 miles surveyed, 0.7 mile is in PFC, 0.44 mile is in a FAR-DN, and the remaining 4.25 acres was dry/intermittent. Stream riparian assessment data from 2001 for Birch Creek springs indicates that out of 0.43 acre surveyed, 0.11 acre is in a FAR-UP, 0.05 acre is classified FAR-NA, and 0.27 acre is in a FAR-DN.

Aquatic Habitat Data

Aquatic habitat surveys were conducted along with fish population surveys by the NDOW in Birch Creek and in Pete Hanson Creek in 2009 (Figure 3.23.4). A three transect aquatic habitat survey was conducted on Birch Creek on July 7 and 8, 2009, and on Pete Hanson Creek on July 6, 7, and 8, 2009 using General Aquatic Wildlife Survey (GAWS) protocol. The GAWS protocol involves capturing, measuring, and weighing native and nonnative trout. An electro-shocker is used to stun the fish so they can be netted with a large dip net. This habitat sampling was intended to capture stream conditions in the fish population sample area and was not intended to serve as a full habitat survey. Habitat transects were located at zero, 50, and 100 feet with multiple stream and habitat parameters being collected (NDOW 2009b).

Birch Creek was flowing clear and cold during the early July 2009 survey with discharge ranging from 1.02 cfs to 4.3 cfs and water temperatures ranging 55 to 61°F. Data indicate that flows experienced during the survey were higher than normal based on precipitation data from the nearest SNOTEL site on Diamond Peak. The NRCS data indicate that the 2009 water year (October 2008 to September 2009) was approximately ten percent above the 25 year average. Average station water width was 4.4 feet with an average water depth of 4.6 inches. The width to depth ratios of Birch Creek observed during the survey ranged from 6.5 to 13.8 with an average wetted ratio measurement of 12.2.

Stream habitat conditions on the surveyed portion of Birch Creek were rated from poor to good with an overall rating of good. This rating was derived by using a Habitat Condition Index (HCI) generated by the six habitat parameters of percent pool measure, percent pool structure, percent age of stream bottom, percent bank cover, percent bank soil stability, and percent bank vegetation stability. HCIs of less than 100 percent can indicate a degree of improvement or potential to increase the habitat condition of stream. These six parameters are used as indicators in determining which areas would be of greater benefit to improve a stream or stream reach (NDOW 2009b).

Overall the lack of quality pools was considered the primary limiting factor. All areas surveyed except for two had a rating of zero percent pool structure (quality pools). Pool structure is a rating of the percent of the pools in a stream or station that are class one, two, and three quality pools. Quality pools are an important component of a stream because they contribute desirable habitats for the rearing, resting, and wintering of fish. Pool measure is the rating of the pool/riffle ratio for a stream or stream reach. An optimum rating would be 100 percent. Although a pool to riffle ratio of one to one is the accepted standard for LCT, recent studies have shown that ratios that range between 0.5 to 1.5:1, tend to produce high numbers of individuals. The measured ratio for Birch Creek was 0.6:1 (38 to 62) (NDOW 2009b).

Stream bottom is a rating of the amount of gravel and rubble (preferred substrate material) at each survey station. During the Birch Creek survey, preferred substrate constituted 55.8 percent of the stream bottom (38.1 percent rubble and 17.8 percent gravel). Embeddedness averaged 31.1 percent (moderate) with values ranging from 6.7 to 66.7 percent. Elevated embeddedness of gravels by fine sediments can negatively affect LCT spawning success. Although the amount of desirable substrate (gravel and cobble) was good, the majority of desirable substrate was cemented and would be unfavorable for LCT spawning and invertebrate production (NDOW 2009b).

Bank cover for Birch Creek in the areas surveyed rated 77.1 percent with approximately 47.2 percent covered with trees, 30.6 percent covered by shrubs, and 22.2 percent of the banks covered with grasses and forbs. No exposed or barren banks were documented. Riparian species on Birch Creek consisted primarily of wild rose (*Rosa woodsii*), perennial herbaceous plants, water birch, willow, cottonwood, aspen, and chokecherry (*Prunus virginiana*). All plant species exhibited fair to excellent density and vigor. The survey protocol would consider a plant community of 100 percent shrubs as the optimum rating. Canopy densities were measured with a concave spherical densiometer. The mean canopy density for Birch Creek in the areas surveyed was 65.9 percent (NDOW 2009b).

Bank soil stability ratings are based upon the banks resiliency to impact. Incorporated in this rating is an evaluation of the associated riparian plant species root mass and depth, the bank material, assessment of raw or eroding banks, and the degree of deposition or scouring occurring in the stream bottom. Bank soil stability ratings on the surveyed areas of Birch Creek had an average rating of 73.6 percent with scores ranging from 54.2 at S6 to 83.3 at S4. Bank stream channel stability of the survey stations on Birch Creek averaged 72.7 (fair), with a range of 60 (good) to 81 (fair). Stability ratings are based on scores of zero to 38 (excellent), 39 to 76 (good), 77 to 114 (fair), and 115 and higher (poor) (NDOW 2009b).

Bank vegetation stability ratings relate to the stability generated by vegetation cover on the stream banks. The rating factors in the amount of the stream bank covered with vegetation or materials that do not allow erosion are boulders, rubble, and gravel. Bank vegetation stability ratings for the survey stations on Birch Creek ranged from 58.3 to 87.5 percent with an average of 72.2 percent. There was no current year livestock use documented at any of the survey sites (NDOW 2009b).

The major invertebrates found during the 2009 survey on Birch Creek include the following: Trichoptera; Ephemeroptera; Plecoptera; Diptera; Coleoptera; and Hirudinea). Invertebrates were common to abundant at all sites along Birch Creek (NDOW 2009b). As a result of their sensitivity to water pollution, the presence and abundance of macroinvertebrates in the Ephemeroptera, Plecoptera, and Trichoptera (common names are, respectively, mayfly, stoneyfly, and caddisfly) indicate good water quality. The presence of insects from these orders in Birch Creek indicates good water quality and prey base for LCT.

Pete Hanson Creek was flowing clear and cold during the July 2009 surveys with discharge ranging from 1.02 cfs to 4.3 cfs and water temperatures ranging from 46 to 59 °F. The data indicate that the flows experienced during the survey were higher than normal based on precipitation data from the nearest SNOTEL site on Diamond Peak. The NRCS data indicates that the 2009 water year (October 2008 to September 2009) was approximately ten percent above the 25 year average. The average station water width on Pete Hanson Creek was 4.4 feet with an average water depth of 5.2 inches. The width to depth ratios were determined by dividing the average station stream water widths in meters by the average station stream water depths in meters. The width to depth ratios observed during the survey ranged from 6.2 to 16.3 with an average wetted ratio measurement of 10.6 (NDOW 2009b).

Stream habitat conditions on the surveyed portion of Pete Hanson Creek were rated from poor to good with an overall rating of fair and were derived by using the HCI. Overall the lack of pools, especially quality pools, were considered the primary limiting factors. All areas surveyed except for two had less than 50 percent pool measure (Figure 3.23.4). The measured ratio for Pete

Hanson Creek was 0.2:1 (16 to 84). Of the pools measured, only two areas surveyed contained quality pools. During the Pete Hanson Creek survey preferred substrate constituted 71.4 percent of the stream bottom (27.6 percent rubble and 43.8 percent gravel). Embeddedness averaged 35.2 percent (moderate) overall with values ranging from 13.3 percent to 53.3 percent (NDOW 2009b).

Bank cover for Pete Hanson Creek rated 72.6 percent with approximately 45.2 percent of the bank coverage was composed of grasses and forbs, 35.7 percent was composed of shrubs, and 19 percent was composed of trees. No exposed or barren banks were documented. The bank cover ratings of survey stations S5, S6, and SF1 were rated at 50 percent based on the lack of shrub species and dominance of grasses. The mean canopy density was 58.6 percent (NDOW 2009b).

Bank soil stability ratings for the areas surveyed on Pete Hanson Creek averaged 74.4 percent with scores ranging from 54.2 to 83.3. Bank Stream channel stability of the survey stations on Pete Hanson Creek averaged 75.6 (fair) with a range of 61 (good) to 95 (fair). Bank vegetation stability ratings ranged from 50.0 to 83.3 percent with an average value of 70.2 percent. There was no current year livestock use documented at any of the survey sites along Pete Hanson Creek; however, evidence of past livestock damage was found at some of the survey sites (NDOW 2009b).

The major invertebrates found during the 2009 surveys include the following: Trichoptera; Ephemeroptera; Plecoptera; Diptera; Hirudinea; Gastropoda; and Hemiptera. Invertebrates were common to abundant at all survey sites along Pete Hanson Creek (NDOW 2009b).

Springsnails

Although no springsnails were observed at any of the 22 springs surveyed in July 2007, many of the springs surveyed were either dry or not flowing. Flowing springs were impacted by cattle or wild horse use (SRK 2007d). Snails were encountered at 15 of the 229 springs surveyed in September and October 2007 (SRK 2010). Snails were observed within the following hydrographic basins: Pine Valley; Diamond Valley; Huntington Valley; Kobeh Valley; and Little Smokey Valley (northern part).

Further, although snails were not observed within the ten-foot water drawdown contour (Figure 3.12.1), two streams where snails were found in the October 2007 survey are located near the predicted ten-foot drawdown boundaries. Survey site KV015 (surveyed October 4, 2007) exists generally northwest from the boundaries. Snail density was found to exceed 500 per square foot. Habitat included gravel, cobble, water cress and a flowing stream. Survey site KV065 (surveyed October 11, 2007) is located roughly southeast of the boundary. Snail density was estimated at 100 per square foot and habitat was noted as a flowing stream. Livestock sign was noted at this site.

The snails species observed during this survey were not collected for positive identification because of the destructive nature of species identification for springsnails. The NDOW identifies that the White Pine mountain snail (*Oreohelix hemphilli*), western glass snail (*Vitrina pellucida*), and the silky vallonia (*Vallonia cyclophorella*) were located in a spring approximately seven miles west of the Project Area (NDOW Public Scoping Comments, March 16, 2007).

3.23.2.2.4 Climate Change

The consequences of weather and climate change on wildlife and fisheries use can be subtle and complex. The projected changes in climate (e.g., increases in temperature, reductions in soil moisture, and more intense rainfall events) may affect habitat, composition, shifts to higher elevation/latitudes, reduced vegetation food sources, altered migration routes, less available water sources, and stream flow change impacts on migratory aquatic species **(U.S. Global Change Research Program 2009)**.

3.23.3 Environmental Consequences and Mitigation Measures

3.23.3.1 Significance Criteria

Based upon NEPA guidelines and commonly accepted criteria, the Proposed Action or alternatives would normally be considered to have a significant effect on wildlife resources if the following occurred:

- Substantially disturbed critical wildlife habitat. Substantial disturbance would be ten percent loss of any critical wildlife species habitat in the short term, or the life of the project, and 20 percent loss cumulatively;
- Impacts to special status species, including direct or indirect disturbance of federally threatened or endangered terrestrial or aquatic wildlife species or their associated critical habitat, or disturbance of USFWS Candidate Species or BLM sensitive species in a manner and a degree that would contribute to their being listed as either federally threatened or endangered;
- Cause loss of birds or nests with eggs protected by the MBTA;
- Result in acute or chronic toxicity resulting from exposure to toxic materials in the process facilities;
- Result in wildlife risks above a threshold for chronic toxic effects from exposure to toxic materials in the pit lake;
- Result in a reduction in flow in Birch or Pete Hanson Creeks, which are identified in the Lahontan Cutthroat Recovery (LCR) Plan;
- Result in a reduction in flow in Henderson Creek or Vinini Creek, which are identified in the LCR Plan and may, in the future, play an important role as habitat for the LCT metapopulations;
- Result in a discharge or change in water quality in the Henderson Creek or Vinini Creek drainages, including ephemeral or seasonal tributaries, which results in quality that is lower than that allowed by the LCT Recovery Plan;
- **Result in a 10 dB or more increase above ambient noise levels during greater sage-grouse lekking season at leks that are located within two miles of the Project Area;** or
- Cause destruction of active bat hibernacula or maternity sites.

3.23.3.2 Assessment Methodology

Potential effects on wildlife resources are described as direct or indirect, short term (i.e., during the life of the Project) and long term. Direct impacts are those that would result in the death or injury of an animal. Indirect impacts include the degradation of wildlife habitat to the extent that population numbers decline **or individuals are displaced**. Short-term impacts are those that

could occur during implementation of the Project and until reclamation is complete. Long-term impacts are those occurring after reclamation is complete. The effects are determined to be significant or not significant based on the applicable significance criteria listed in Section 3.24.3.1.

3.23.3.3 Proposed Action

3.23.3.3.1 General Wildlife

Construction and operation of the Project would directly affect wildlife habitat through removal of vegetation in areas proposed for surface disturbance, as detailed in Section 3.9. The majority of the surface disturbance resulting from the Proposed Action would occur in the big sagebrush vegetation community. Approximately 8,355 acres of wildlife habitat would be directly removed over the 44-year mine life as a result of implementation of the Proposed Action. Due to incremental reclamation, this acreage would not be disturbed all at one time. Upon completion, the reclamation portion of the Proposed Action would be completed for 7,621 acres (91 percent of the disturbed area). Approximately 734 acres of the previous wildlife habitat in the open pit would be removed and not reclaimed, leaving a pit lake and steep rocky cliffs. Surface disturbance would be revegetated with a BLM-approved seed mix that includes native seeds or plants that are compatible with native soils located in the Project Area and includes forb and shrub species to provide forage for wildlife.

Mule deer migrate along routes from Pine Valley south around to the Roberts Mountains in to Kobeh Valley and Diamond Valley. Although it is possible that the proposed mine and well field, including the fences, roads, and human activity, may affect deer migration, it is not possible to quantify the potential impact.

Mitigation developed for water resources (Section 3.2.3), wild horses (Section 3.13.3), and special status species (Section 3.23.3.3.2) would reduce Project-related impacts to general wildlife species. These mitigation measures include the following: development of six water sites, which would increase water availability in the Project Area; **low profile pumps and cabinetry that minimize contrast with the surrounding environment;** buried pipelines that would not limit wildlife movement; fences constructed around areas of disturbance that would keep wildlife out of dangerous areas; **buried transmission lines; perch deterrents** on transmission lines that would decrease predation of smaller mammalian, reptilian, and avian species; electrocution prevention measures; the removal of nesting material from transmission lines and equipment that would ensure that the **perch deterrents** are effective; noise reducing enclosures or sound barriers on walls on pumps in the greater sage-grouse habitat that would also benefit other wildlife species in the area; and speed limits on Project roads that would decrease the potential of vehicular mortality of wildlife species.

- **Impact 3.23.3.3-1:** Approximately 8,355 acres of wildlife habitat would be directly removed as a result of the Proposed Action over the 44-year mine life.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Post-reclamation wildlife habitat would differ from pre-Project habitat in vegetation compositions and age class. A portion of the Project Area would be converted from a shrub-dominated community to a grass/forb dominated community in the short term, as described in Section 3.9. Many game and nongame wildlife species may breed, forage, or roost in or near the Project Area. Potential long-term impacts to these species could include loss of nesting, brooding, roosting, foraging, and cover habitats. Once reclaimed, the vegetation that became established would, through succession, create a more shrub dominant habitat within three to five years; however, it may take 15 to 20 years to establish mature shrubs. In the short term, only seed-eating and early forb/grass-eating species such as rabbits and seed eating birds would benefit from reclamation efforts. Other game and most nongame wildlife would benefit more over time, as diversity, cover, nesting habitat potential, and forage quality increase.

- **Impact 3.23.3.3-2:** Modification of wildlife habitat and subsequent reclamation efforts would result in less available mature vegetation for cover, forage, and nesting habitat for many species of wildlife in the short term.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Noise disturbance would be continuous for approximately 44 years during implementation of the Proposed Action. Sudden loud noises such as blasts could cause wildlife to disperse in directions away from the sound. This behavior could send wildlife into unfamiliar terrain. Some wildlife may avoid the area while others may tolerate the noise and continue foraging and breeding activities in the vicinity of the Project Area.

Noise modeling indicates that an increase of 10 dB above ambient noise levels is expected at a distance of 9,800 feet from the booster pumps (Personal Communication, Jim Buntin, August 3, 2012). Two known greater sage-grouse leks located in Kobeh Valley are located within this area that would experience a 10 dB increase in noise.

- **Impact 3.23.3.3-3:** Loud and sudden noises associated with the Proposed Action could result in wildlife displacement for the life of the Project.

  Significance of the Impact: The proposed Project may produce **an increase greater than 10 dB above ambient noise levels**, which can be detrimental to **lekking** greater sage-grouse. Therefore, the impact is considered significant and the following mitigation measure has been identified.

- **Mitigation Measure 3.23.3.3-3:** Mitigation for noise impacts is included in Mitigation Measure 3.23.3.3-6 (as identified in the Sage Grouse **Conservation Measures** in Appendix **D, Attachment 3**) and includes noise reducing enclosures **that** would be installed on **the Project's booster stations in Kobeh Valley as well as possible modification to the pumping regime during lekking season**.

  Effectiveness of Mitigation and Residual Effects: Implementation of Mitigation Measure 3.23.3.3-3 would be effective to reduce any impacts from noise to greater sage-grouse to less than significant.

The mine water supply system and the dewatering and subsequent refilling of the open pit is expected to drawdown the ground water table in an area surrounding the open pit and the Kobeh Valley Well Field. As discussed in Section 3.2.3, modeling results show that a water table drawdown of ten feet or more in the aquifer would occur in an area measuring approximately 232 square miles around the Project Area including the northern two-thirds of Kobeh Valley and the southern portion of the Roberts Mountains, from Lone Mountain to Roberts Creek Ranch, and from the 3 Bars Road in Kobeh Valley to the western Whistler Mountains.

Water sources utilized by wildlife within the ten-foot drawdown contour from Proposed Action pumping include springs within the Kobeh Valley, Diamond Valley, and Pine Valley Hydrographic Basins. As discussed in Section 3.2.3.3, there would be 22 springs**,** 7.7 miles of perennial streams**, and 61.4 acres of riparian areas associated with these creeks** located within the ten-foot drawdown contour. Table 3.2-**8** outlines the springs that would be affected. There are eight wildlife water rights associated with some of these springs that would be affected by the drawdown (Table 3.2-7). In addition, wildlife utilize stock watering sites and there are 12 water rights associated with stock watering within the ten-foot drawdown contour that would be affected by the Project activities. Impacts to water rights are discussed in detail in Section 3.2.3.3.

Game species (i.e., mule deer and pronghorn) require water year round, as needed, to satisfy physiological requirements. The reduction or loss of existing water sources could impact big game use and movements. As discussed above, relatively small big game populations currently occupy the Project Area; however, based on the mule deer habitat available within the projected ground water drawdown area, some individuals could be displaced due to the reduction of surface water and wetlands and riparian vegetation and may move into adjacent areas that are already at their carrying capacity. These displaced individuals could be lost from the population; however, this loss cannot reasonably be quantified.

A reduction in surface water and wetlands and riparian habitat would affect the amount of nesting, brooding, and foraging habitat for upland game birds (e.g., greater sage grouse, mourning dove) and denning and foraging habitat for small game mammals and furbearers. **Direct impacts to the 0.22 acre of riparian vegetation associated with the Zinc adit are expected from the Project and would affect habitat available for wildlife.** A decline in surface water availability would also impact the extent of available vegetation along portions of springs and streams. Since wetlands and riparian communities are limited within and adjacent to the Project Area, it would be difficult for displaced individuals to relocate into adequate breeding or foraging habitat in adjacent areas, as it is assumed that these habitats already would be at carrying capacity. As a result some animals could be lost from the population.

- **Impact 3.23.3.3-4:** Wildlife dependent on vegetation growing near perennial streams, springs, and seeps would potentially experience water stress due to the water table drawdown associated with mine dewatering and subsequent filling of the open pit. Lowering of the water table in the area of these plants would potentially cause a decline in the wetland vegetation community and the associated wildlife species. The lowering of the water table would also potentially result in less water for wildlife consumption.

  Significance of the Impact: The impact could be significant. The BLM has identified the following mitigation that would benefit wildlife.

- **Mitigation Measure 3.23.3.3-4**: Mitigation for the potential loss of water would include the development of six water sites (Figure 3.13.1) **that were identified for wild horses and two additional sites that would be designed specifically for wildlife use**. Although the sites **shown on Figure 3.13.1** were identified as part of mitigation for wild horses (Section 3.13), development of the sites **could** also result in indirect beneficial impacts to wildlife species throughout the Project Area. **The locations and design of the wildlife-specific water developments would be determined by the Wildlife Working Group described in the Sage Grouse Conservation Measures in Appendix D, Attachment 3.** Additional mitigation has been proposed for wetland vegetation in Section 3.11 (Mitigation Measure 3.11.3.3-**3**).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measures 3.11.3.3-1 and 3.23.3.3-4 would reduce impacts to the loss of riparian habitat during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the temporary loss of riparian vegetation.

The evaluation of the potential effects of the pit lake on terrestrial and avian wildlife was completed with the use of a SLERA. Only terrestrial and avian wildlife species were evaluated since no fish are expected to populate the pit lake. The general approach used in the preparation of the SLERA is similar to that developed by the Environmental Sciences Division and Life Sciences Division of Oak Ridge National Laboratory for the U.S. Department of Energy. In addition, the SLERA incorporated recent TRVs for certain inorganic chemical constituents derived by the EPA (SRK 2009). Together, these were used to develop species-specific toxicity criteria to which the predicted constituents in the pit water were compared.

The toxicity criteria were developed based on species-specific No Observed Adverse Effects Levels (NOAELs) and TRVs, published and calculated water ingestion rates, and average individual body weights. Criteria were developed for eight species, including the little brown bats (*Myotis lucifugus*), white-footed mouse (*Peromyscus leucopus*), cottontail rabbit (*Sylvilagus audubonii*), white-tailed deer (*Odocoileus virginianus*), red-tailed hawk (*Buteo jamaicensis*), mallard duck (*Anas platyrhynchos*), common barn owl, (*Tyto alba*) and rough-winged swallow (*Stelgidopteryx serripennis*). These species are considered reasonable surrogate species for the populations that would likely inhabit the region in and around the pit lake. A surrogate species, while not necessarily occurring in the area, typically occupies similar niches, has similar body masses, and similar exposure parameters to the known occupants of the area. For example, the white-tailed deer was selected as a substitute species for evaluation because literature data are limited on mule deer, which is a common animal in the area. This same approach holds true for the other species expected to be in the Project Area.

Protective criteria for the surrogate species are likely to be protective of local species occupying similar ecological niches at the Project Area. Additionally, it was assumed that the wildlife receptors would consume water from the pit lake and that this water would constitute 100 percent of daily water requirements for each individual species (i.e., no outside sources of water would be utilized over the life of the animal). This is considered to be a conservative assumption. On the basis of a comparison of the estimated concentrations of phosphorus in the future pit lake with general information about concentrations of nutrients expected in lakes (Horne and Goldman 1994), the pit lake is expected to be oligotrophic, i.e., to have low productivity, after the first 200 years. An oligotrophic pit lake is not expected to support significant primary productivity or development of littoral vegetation. Therefore, food web

exposures were considered incomplete for most receptor surrogates, and complete but minor for insectivorous birds and bats. Risks due to ingestion of contaminated foods by wildlife were therefore not evaluated.

- **Impact 3.23.3.3-5:** The result of the assessment for wildlife (terrestrial and avian) indicates a low risk based on calculated species-specific toxicity criteria using recent EPA developed TRVs. None of the chemicals of potential ecological concern identified in the predicted pit lake water poses a credible risk to wildlife that may inhabit the area and use the pit lake as a drinking water source.

  Significance of the Impact: The potential to adversely affect the health of terrestrial or avian life is considered negligible. Based on the predicted pit lake chemistry, calculated toxicity criteria, and predicted utilization of the open pit water by wildlife, the overall ecological risk of the Proposed Action is considered to be low. The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.23.3.3.2 Special Status Wildlife Species

Greater Sage-Grouse

According to NDOW's Habitat Characterization Map, there are approximately 3,544 acres of PPH and approximately 1,965 acres of PGH within the Project Area that would be permanently affected by the Project (i.e., areas that would not be available as greater sage-grouse habitat following Project reclamation).

Impacts to greater sage-grouse **as well as PPH** and **PGH** within and adjacent to the Project Area are expected as a result of the development of the Kobeh Valley Well Field. The well field would be located directly west and southwest of the proposed open pit mine and processing operations and could impact the movement of greater sage-grouse between Kobeh Valley and the Roberts Mountains. The proposed well field would target both the carbonate and alluvial aquifers located in Kobeh Valley. The carbonate aquifers are generally located at the foot of the Roberts Mountains in the area of Roberts, Rutabaga, and Coils Creeks. The targeted alluvial aquifers are located primarily in the northeastern quadrant of Kobeh Valley, north of Lone Mountain, to the base of the Roberts Mountains, west of Whistler Ridge and east of Coils Creek.

Impacts to greater sage-grouse as a result of the Proposed Action include the following: increased raptor or scavenger predation from elevated equipment and power poles; visual encroachment or interruptions created by elevated equipment, power poles, vehicular travel and dust; interruption of "bird foot traffic" created by above ground pipes, extended elevated berms, or other linear features that may block passage; noise created by pumps, vehicles, and equipment; collision with fences and other structures; habitat fragmentation; and unreclaimed surface disturbance resulting in habitat loss.

- **Impact 3.23.3.3-6:** Greater sage-grouse individuals **as well as approximately 3,544 acres of PPH and approximately 1,965 acres of PGH within the Project Area** could be impacted as a result of the Proposed Action.

Significance of the Impact: This impact is considered potentially significant with respect to greater sage-grouse, a USFWS candidate species and a BLM sensitive species, and greater sage-grouse habitat and the following mitigation measures **have** been identified.

- **Mitigation Measure 3.23.3.3-6:** Mitigation measures are identified in the **Mount Hope** Sage Grouse **Conservation Measures** (Appendix **D, Attachment 3**). **The measures identified in this attachment include the following: conservation measures for low profile camouflaged equipment, water pipelines, transmission lines, nesting/perching maintenance, noise, perimeter fence collision prevention, seasonal restrictions, and minimization of additional disturbance; off-site mitigation; formation of a Wildlife Working Group; research; and treatment options for burial of the above-ground powerline and vegetation treatments.** Additional mitigation developed for pygmy rabbits (Mitigation Measure 3.23.3.3-**9**) would reduce the effect to sagebrush habitat utilized by greater sage-grouse. Mitigation Measure 3.13.3.3-1 also minimizes habitat fragmentation from the wellfield pipeline.

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.23.3.3-6 would reduce impacts to greater sage-grouse during Project activities to less than significant through the implementation of **conservation measures and off-site mitigation** (Appendix **D**).

Migratory Birds and Raptors

Construction and operation of the Project would directly affect migratory bird and raptor habitat through removal of vegetation in areas proposed for surface disturbance, as detailed in Section 3.9.3. The majority of the surface disturbance resulting from the Proposed Action would occur in the big sagebrush vegetation community. Approximately 8,3**55** acres of migratory bird and raptor habitat would be directly removed over the 44-year mine life as a result of implementation of the Proposed Action. Potential impacts to breeding migratory birds from the Project would include possible direct loss of nests (e.g., crushing) or indirect effects (e.g., abandonment) from increased noise and human presence within close proximity to an active nest site. Vegetation removal would result in a reduction of breeding habitat for migratory birds in the Project Area. This acreage would not all be disturbed at one time due to incremental reclamation. Approximately 734 acres of migratory bird habitat in the vicinity of the open pit would be converted to a pit lake and steep cliffs. This conversion would increase raptor perching habitat.

Golden eagles nesting and foraging habitat are present in the Project Area. In order to avoid impacts to individual golden eagles and their nesting habitat, implementation of the environmental protection measure outlined in Section 2.2.13 for migratory birds would ensure that prior to surface disturbance a nesting survey for migratory birds (including golden eagles) would be conducted and nests avoided. Impacts to golden eagle foraging habitat would be reduced through reclamation including revegetation. Indirect impacts to golden eagles nests and habitat within ten miles of the Project could include noise and dust. These impacts are expected to last the duration of the Project and reclamation.

- **Impact 3.23.3.3-7:** Approximately 8,3**55** acres of migratory bird and raptor habitat would be directly removed over the 44-year mine life as a result of the Proposed Action.

Significance of the Impact: This impact is considered potentially significant with respect to vegetation removal during the avian breeding season that results in a violation of the MBTA and the following mitigation measure has been identified.

- **Mitigation Measure 3.23.3.3-7:** Land clearing would be conducted outside the avian breeding season, which is March 1st through August 31st for raptors and April 1st through August 1st for other migratory birds. If this is not possible, then a qualified biologist would survey the area to be cleared prior to clearing, within 14 days of disturbance. If disturbance has not occurred within 14 days of the survey, another survey would be conducted. If active nests were identified, or if other evidence of nesting (mated pairs, territorial defense, carrying nesting material, transporting food) was observed as a result of this survey, then a protective buffer (the size of which would depend on the requirements of the species) would be delineated and the delineated protective buffer avoided to prevent destruction or disturbance to nests until the nests were no longer active or nesting activities were no longer observed.

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.23.3.3-7 would reduce impacts to migratory birds during Project activities to less than significant by ensuring no direct impacts to nesting birds would occur.

- **Impact 3.23.3.3-8:** Loud or sudden noises associated with the Proposed Action could result in an indirect impact (i.e., disturbance) to golden eagles nesting east of the Project Area.

  Significance of the Impact: This impact is considered potentially significant with respect to Project activities during the golden eagle breeding season that may result in a violation of the Bald and Golden Eagle Protection Act and the following **monitoring and adaptive management** mitigation **have** been identified.

- **Mitigation Measure 3.23.3.3-8: All suitable** golden eagle nesting habitat located **within a five-mile radius** of the Project Area **boundary** would be surveyed twice a year by a qualified biologist for the life of the Project to check the use status of golden eagle nests and habitat. If a nest is determined to be active, the nests would be monitored by **video (with still images recorded every five minutes) and the recording would be reviewed by** a qualified biologist once a week until the young have fledged. During the 18- **to 24-**month construction phase, the timing of weekly monitoring of active nests would occur from sunrise to sunset **by video (with still images recorded every five minutes)**. During the 44-year mine life, the weekly monitoring for active nests would coincide with blasting activities. The **video camera** would **record** the nest beginning two hours before the blast and end two hours after the blast **(with continuous video images recording)**. Annual reports would be submitted to the BLM biologist summarizing the results of the surveys. **Following one year of monitoring, the qualified biologist would develop interpretable metrics to evaluate whether disturbance affects golden eagles. If there are impacts to golden eagles identified, the qualified biologist would coordinate with the BLM and USFWS to develop an adaptive management strategy to mitigate impacts for subsequent years.** If a negative impact to nesting golden eagles is detected during monitoring, the BLM biologist would be contacted by electronic mail or phone by the next business day.

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.23.3.3-8 would reduce impacts to golden eagles during Project activities to less than significant by ensuring no direct impacts to nesting birds would occur.

Pygmy Rabbits

As shown on Figure 3.23.3, the pygmy rabbits and burrows located to the east and north of Mount Hope would be impacted by Project activities. The PAG and the LGO Stockpile would be constructed over burrows and areas where pygmy rabbits have been sighted. In addition, the Project access road and growth media stockpiles may cover burrows and areas where pygmy rabbits have been sighted. This impact would be limited to selected burrows and a limited number of individuals may be extirpated; however, this impact is not expected to result in a population-level effect that would affect the potential listing of the species under the ESA. Additionally, the BLM has calculated that approximately 475 acres of pygmy rabbit habitat would be disturbed by the Project. Of those 475 acres, 211 acres were occupied during the wildlife surveys and 264 acres are considered potential habitat.

- **Impact 3.23.3.3-9:** Pygmy rabbit individuals and habitat could be impacted as a result of the Proposed Action.

  Significance of the Impact: This impact is not considered significant with respect to pygmy rabbits; however, the BLM proposes the following mitigation measure.

- **Mitigation Measure 3.23.3.3-9:** EML would fund future sagebrush habitat improvement projects in the area **that would directly benefit pygmy rabbits**. Based **on** a ratio of two acres per every acre disturbed**, EML would provide 950 acres of habitat improvement projects. Projects would be selected by the Wildlife Working Group which would review greater sage-grouse habitat projects (described in Appendix D, Attachment 3). Projects that benefit both greater sage-grouse and pygmy rabbits could count toward both acreage requirements as approved by the Wildlife Working Group.**

- **Effectiveness of Mitigation and Residual Effects:** Although direct effects to pygmy rabbits and their habitat would occur in the Project Area, this mitigation would ensure additional pygmy rabbit habitat is created to replace the habitat removed at a two to one ratio.

Burrowing Owls

Potential habitat for burrowing owls was identified in the Kobeh Valley portion of the Project Area. Since no burrowing owl nests were found in the Project Area, Project-related surface disturbance could result in impacts to burrowing owls by a reduction in available habitat. This reduction is unlikely to result in a reduction in population viability in the Project Area. Nest surveys implemented prior to construction (as described in Mitigation Measure 3.23.3.3-7) would ensure that no nesting activity would be affected.

Lahontan Cutthroat Trout

No direct impacts to LCT would occur as a result of implementation of the Proposed Action. Potential indirect impacts to LCT from aquifer drawdown would not be anticipated. As shown on Figure 3.23.3 the ten-foot drawdown contour would not intercept any of the springs and perennial reaches in the Birch or Pete Hanson Creeks, which are identified in the Lahontan Cutthroat Trout Species Management Plan (SMP) for the Upper Humboldt River Drainage Basin, or Willow Creek. A reduction in flow may occur in Henderson Creek, which, along with Vinini Creek, are identified in the SMP as streams that may, in the future, play an important role as habitat for the LCT metapopulations. A discharge or change in water quality could occur in the Henderson Creek drainage, including ephemeral or seasonal tributaries, which may result in water quality that is lower than that allowed by the SMP. In a memorandum dated October 19, 2011, the USFWS concurred with the determination that the Project may affect, but is not likely to adversely affect LCT.

- **Impact 3.23.3.3-10:** There may be a decrease in flows within Henderson Creek, which may affect the creek's criteria for use in LCT recovery.

  Significance of the Impact: This impact is considered potentially significant with respect to a LCT recovery creek. The following mitigation has been identified by the BLM to limit to potential effects to Henderson Creek and to ensure that there would not be an effect to Birch Creek or Pete Hanson Creek.

- **Mitigation Measure 3.23.3.3-10:** The mitigation measures identified in Section 3.2.3 would be sufficient to mitigate the impacts to LCT from the Proposed Action.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of Mitigation Measure 3.2.3.3-2b and the use of any of the options outlined in Section 3.2.3 would be effective at mitigating the impacts from reduced surface water flows. The effectiveness of Mitigation Measure 3.2.3.3-2c, if implemented, is less certain since the implementation would be many decades in the future. However, if measures used in Mitigation Measure 3.2.3.3-2b are implemented, then the measure should be effective at mitigating the impacts from reduced surface water flows. Over a long period of time (tens to **hundreds** of years) the effects to most surface water flows would diminish; however, for the springs nearest to the open pit, flows would be reduced or eliminated in perpetuity.

Yellow-billed Cuckoo and Springsnails

No suitable or occupied habitat for yellow-billed cuckoos was identified in the Project Area or within the ten-foot drawdown contour; therefore, the Proposed Action is not expected to impact yellow-billed cuckoos. Although springs are located in the Project Area, there are not any springs identified that springsnails would occupy. No springsnails were located in the Project Area or within the ten-foot drawdown contour; therefore, the Proposed Action is not expected to impact springsnails. Mitigation **for impacts to surface water resources are outlined** in Section 3.2.3.

Bats

Surveys within the Project Area identified the small-footed myotis and Townsend's big-eared bat as occurring within the Project Area. Impacts to the small-footed myotis and Townsend's big-

eared bat would be the same as the impacts described above for general wildlife, which is a loss of foraging habitat.

- **Impact 3.23.3.3-11:** Bat foraging habitat would be impacted as a result of the Proposed Action over the 44-year mine life.

  Significance of the Impact: This impact is not considered significant; however, the following mitigation is proposed.

- **Mitigation Measure 3.23.3.3-11:** In order to minimize impacts to bat habitat, prior to the initiation of Project activities, EML would close those mine workings that would be removed over the life of the Project (after bats have been evacuated) and install bat-friendly closures on openings that would not be directly impacted by the Project in order to preserve access to the remaining bat habitat (also see Appendix **D, Attachment 4**).

- **Effectiveness of Mitigation and Residual Effects:** The protection of specific mine openings in the Project Area would be effective as mitigation for the loss of habitat associated with those mines that would be removed as a result of Project activities. Bats excluded from the closed mines in the Project Area are familiar with the mine openings that would remain accessible and would take advantage of its preservation.

3.23.3.3.3 Residual Adverse Impacts

The Proposed Action would result in the unavoidable loss of 734 acres of terrestrial wildlife habitat resulting from surface disturbance in the open pit area. Approximately 7,**621** acres of wildlife habitat would be removed in the short term and then reclaimed as a result of mine development, operation, and closure. The reclaimed land would have more grass and forb forage and less mature shrub forage in the short term. Browsers would benefit the most from the early seral stage vegetation in the short term. As the plant communities within the Project Area mature, within a period of 15 to 20 years, larger shrubs would provide additional cover for larger animals and less of a forage prey base for raptors, similar to the existing conditions.

3.23.3.4 No Action Alternative

Under the No Action Alternative, the proposed Project would not be developed and associated impacts to wildlife would not occur. EML would continue existing activities under previously permitted Notices and the area would remain available for future mineral development or for other purposes as approved by the BLM.

3.23.3.4.1 Residual Adverse Impacts

There would be no residual adverse impacts to wildlife under the No Action Alternative.

3.23.3.5 Partial Backfill Alternative

The Partial Backfill Alternative would result in the unavoidable loss of up to 734 acres of wildlife foraging habitat resulting from surface disturbance in the open pit area. Approximately **8,148** acres of foraging habitat would be removed in the short term and then reclaimed as a result

of mine development, operation, and closure. The reclaimed land would have more grass and forb forage and less mature shrub forage in the short term.

3.23.3.5.1 General Wildlife

Impacts to wildlife under this alternative would be similar to the impacts described above for the Proposed Action.

- **Impact 3.23.3.5-1:** Approximately 8,355 acres of wildlife habitat would be directly removed as a result of the Proposed Action over the 44-year mine life.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.23.3.5-2:** Modification of wildlife habitat and subsequent reclamation efforts would result in less available mature vegetation for cover, forage, and nesting habitat for many species of wildlife in the short term.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.23.3.5-3:** Loud and sudden noises associated with the Partial Backfill Alternative could result in wildlife displacement for the life of the Project.

  Significance of the Impact: The proposed Project may produce **an increase greater than 10 dB above ambient noise levels**, which can be detrimental to **lekking** greater sage-grouse. Therefore, the impact is considered significant and the following mitigation measure has been identified.

- **Mitigation Measure 3.23.3.5-3:** Mitigation for noise impacts is included in Mitigation Measure 3.23.3.3-6 (as identified in the Sage Grouse **Conservation Measures** in Appendix **D, Attachment 3**) and includes noise reducing enclosures that would be installed on **the Project's booster stations in Kobeh Valley as well as possible modification to the pumping regime during lekking season**.

  Effectiveness of Mitigation and Residual Effects: Implementation of Mitigation Measure 3.23.3.5-3 would be effective to reduce any impacts from noise to greater sage-grouse to less than significant.

- **Impact 3.23.3.5-4:** Wildlife dependent on vegetation growing near perennial streams, springs, and seeps would potentially experience water stress due to the water table drawdown associated with mine dewatering and subsequent filling of the open pit. Lowering of the water table in the area of these plants would potentially cause a decline in the wetland vegetation community and the associated wildlife species. The lowering of the water table would also potentially result in less water for wildlife consumption.

Significance of the Impact: The impact could be significant. The BLM has identified the following mitigation that would benefit wildlife.

- **Mitigation Measure 3.23.3.5-4:** Mitigation for the potential loss of water would include the development of six water sites (Figure 3.13.1) **that were identified for wild horses and two additional sites that would be designed specifically for wildlife use**. Although the sites **shown on Figure 3.13.1** were identified as part of mitigation to wild horses (Section 3.13), development of the sites **could** also result in indirect beneficial impacts to wildlife species throughout the Project Area. **The locations and design of the wildlife-specific water developments would be determined by the Wildlife Working Group described in the Sage Grouse Conservation Measures in Appendix D, Attachment 3.** Additional mitigation has been proposed for wetland vegetation in Section 3.11 (Mitigation Measure 3.11.3.3-**3**).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measures 3.11.3.3-1 and 3.23.3.3-4 would reduce impacts to the loss of riparian habitat during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the temporary loss of riparian vegetation.

- **Impact 3.23.3.5-5:** The result of the assessment for wildlife (terrestrial and avian) indicate a low risk based on calculated species-specific toxicity criteria using recent EPA developed TRVs. None of the chemicals of potential ecological concern identified in the predicted pit lake water poses a credible risk to wildlife that may inhabit the area and use the pit lake as a drinking water source.

  Significance of the Impact: The potential to adversely affect the health of terrestrial or avian life is considered negligible. Based on the predicted pit lake chemistry, calculated toxicity criteria, and predicted utilization of the open pit water by wildlife, the overall ecological risk of the Proposed Action is considered to be low. The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

While a permanent pit lake is not anticipated to form under the Partial Backfill Alternative, it is possible that an ephemeral pond could form on top of the backfill in the pit during times of high runoff or when ground water approaches the surface of the backfill. If this shallow water body persisted for any length of time, it could develop littoral biologic habitats. The water quality of this pond would be expected to exceed screening levels for the constituents that are elevated in pit wall runoff (Cd, fluoride, and Mn). If this pond would become permanent, it would continuously evapoconcentrate, which would create elevated levels of other constituents. Though no specific analysis is provided, the potential for a perpetual lake is assumed for this analysis and the resultant evapoconcentration in the lake would create the potential for an ecological risk to mammalian and avian species that would utilize the water.

- **Impact 3.23.3.5-6:** The development of a perpetual lake over the backfill would create a potential ecological risk to mammalian and avian species that used the lake.

Significance of the Impact: This impact is considered potentially significant with respect to those mammalian and avian species and the following mitigation measure has been identified.

- **Mitigation Measure 3.23.3.5-6:** Mitigation under the Partial Backfill Alternative would be the same as mitigation under the Water Resources - Water Quality for the Partial Backfill Alternative (Mitigation Measure 3.3.3.5-3).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation for this impact would require the removal of sufficient backfill material for the formation of an evaporative ground water sink. Implementation of this mitigation would otherwise be inconsistent with the reasoning for selecting this alternative.

3.23.3.5.2 Special Status Wildlife Species

Impacts to special status wildlife species under this alternative would be similar to the impacts described above for the Proposed Action.

- **Impact 3.23.3.5-7:** Greater sage-grouse individuals **as well as approximately 3,544 acres of PPH and approximately 1,965 acres of PGH within the Project Area** could be impacted as a result of the Proposed Action.

  Significance of the Impact: This impact is considered potentially significant with respect to greater sage-grouse, a USFWS candidate species and a BLM sensitive species, and greater sage-grouse habitat and the following mitigation measure **have** been identified.

- **Mitigation Measure 3.23.3.5-7:** Mitigation under the Partial Backfill Alternative would be the same as mitigation under the Proposed Action (Mitigation Measure 3.23.3.3-6).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.23.3.3-6 would reduce impacts to greater sage-grouse during Project activities to less than significant through the implementation of **conservation measures and off-site mitigation** (Appendix **D, Attachment 3**).

- **Impact 3.23.3.5-8:** Approximately 8,3**55** acres of migratory bird and raptor habitat would be directly removed over the 44-year mine life as a result of the Proposed Action.

  Significance of the Impact: This impact is considered potentially significant with respect to vegetation removal during the avian breeding season that results in a violation of the MBTA and the following mitigation measure has been identified.

- **Mitigation Measure 3.23.3.5-8:** Mitigation under the Partial Backfill Alternative would be the same as mitigation under the Proposed Action (Mitigation Measure 3.23.3.5-7).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.23.3.3-7 would reduce impacts to migratory birds during Project activities to less than significant by ensuring no direct impacts to nesting birds would occur.

- **Impact 3.23.3.5-9:** Loud or sudden noises associated with the Partial Backfill Alternative could result in an indirect impact (i.e., disturbance) to golden eagles nesting east of the Project Area.

  Significance of the Impact: This impact is considered potentially significant with respect to Project activities during the golden eagle breeding season that may result in a violation of the Bald and Golden Eagle Protection Act and the following mitigation measure has been identified.

- **Mitigation Measure 3.23.3.5-9:** Mitigation under the Partial Backfill Alternative would be the same as mitigation under the Proposed Action (Mitigation Measure 3.23.3.3-8).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.23.3.3-8 would reduce impacts to golden eagles during Project activities to less than significant by ensuring no direct impacts to nesting birds would occur.

- **Impact 3.23.3.5-10:** Pygmy rabbit individuals and habitat could be impacted as a result of the Proposed Action.

  Significance of the Impact: This impact is not considered significant with respect to pygmy rabbits; however, the BLM proposes the following mitigation measure.

- **Mitigation Measure 3.23.3.5-10:** Mitigation under the Partial Backfill Alternative would be the same as mitigation under the Proposed Action (Mitigation Measure 3.23.3.3-9).

- **Effectiveness of Mitigation and Residual Effects:** Although direct effects to pygmy rabbits and their habitat would occur in the Project Area, this mitigation would ensure additional pygmy rabbit habitat is created to replace the habitat removed at a two to one ratio.

- **Impact 3.23.3.5-11:** There may be a decrease in flows within Henderson Creek, which may affect the creek's criteria for use in LCT recovery.

  Significance of the Impact: This impact is considered potentially significant with respect to a LCT recovery creek. The following mitigation has been identified by the BLM to limit the potential effect to Henderson Creek and to ensure that there would not be an effect to Birch Creek or Pete Hanson Creek.

- **Mitigation Measure 3.23.3.5-11:** Mitigation under the Partial Backfill Alternative would be the same as mitigation under the Proposed Action (Mitigation Measure 3.23.3.3-10).

- **Effectiveness of Mitigation and Residual Effects:** Implementation of Mitigation Measure 3.2.3.3-2b and the use of any of the options outlined in Section 3.2.3 would be effective to effective at mitigating the impacts from reduced surface water flows. The effectiveness of Mitigation Measure 3.2.3.3-2c, if implemented, is less certain since it would be many decades in the future. However, if measures used in Mitigation Measure 3.2.3.3-2b are implemented, then the measure should be effective at mitigating the impacts from reduced surface water flows. Over a long period of time (tens to **hundreds**

of years) the effects to most surface water flows would diminish; however, for the springs nearest to the open pit, flows would be reduced or eliminated in perpetuity.

- **Impact 3.23.3.5-12:** Bat foraging habitat would be impacted as a result of the Partial Backfill Alternative for the duration of the Project.

  Significance of the Impact: This impact is not considered significant; however, the following mitigation is proposed.

- **Mitigation Measure 3.23.3.5-12:** In order to minimize impacts to bat habitat, prior to the initiation of Project activities, EML would close those mine workings that would be removed over the life of the Project (after bats have been evacuated) and install bat-friendly closures on openings that would not be directly impacted by the Project in order to preserve access to the remaining bat habitat (also see Appendix **D, Attachment 4**).

- **Effectiveness of Mitigation and Residual Effects:** The protection of specific mine openings in the Project Area would be effective as mitigation for the loss of habitat associated with those mines that would be removed as a result of Project activities. Bats excluded from the closed mines in the Project Area are familiar with the mine openings that would remain accessible and would take advantage of its preservation.

3.23.3.5.3 Residual Adverse Impacts

The Partial Backfill Alternative would result in the unavoidable loss of 527 acres of wildlife foraging habitat resulting from surface disturbance in the open pit area. Approximately 8,355 acres of foraging habitat would be removed over the 44-year mine life, and then all but 527 acres would be reclaimed as a result of mine development, operation, and closure. The reclaimed land would have more grass and forb forage and less mature shrub forage in the short term, and therefore, the full 734 acres of disturbance is considered in this impact analysis.

3.23.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Although the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in approximately 20 acres less surface disturbance compared to the Proposed Action, impacts to wildlife from this alternative would be similar to those for the Proposed Action since the acreage would decrease by only 0.2 percent.

3.23.3.6.1 General Wildlife

Impacts to wildlife under this alternative would be similar to the impacts described above for the Proposed Action.

- **Impact 3.23.3.6-1:** Approximately 8,355 acres of wildlife habitat would be directly removed as a result of the Proposed Action over the 44-year mine life.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.23.3.6-2:** Modification of wildlife habitat and subsequent reclamation efforts would result in less available mature vegetation for cover, forage, and nesting habitat for many species of wildlife in the short term.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.23.3.6-3:** Loud and sudden noises associated with the Proposed Action could result in wildlife displacement for the life of the Project.

  Significance of the Impact: The proposed Project may produce an increase greater than 10 dB above ambient noise levels, which can be detrimental to lekking greater sage-grouse. Therefore, the impact is considered significant and the following mitigation measure has been identified.

- **Mitigation Measure 3.23.3.6-3: Mitigation for noise impacts is included in Mitigation Measure 3.23.3.3-6 (as identified in the Sage Grouse Conservation Measures in Appendix D, Attachment 3) and includes noise reducing enclosures that would be installed on the Project's booster stations in Kobeh Valley as well as possible modification to the pumping regime during lekking season.**

  Effectiveness of Mitigation and Residual Effects: Implementation of Mitigation Measure 3.23.3.6-3 would be effective to reduce any impacts from noise to greater sage-grouse to less than significant.

- **Impact 3.23.3.6-4:** Wildlife dependent on vegetation growing near perennial streams, springs, and seeps would potentially experience water stress due to the water table drawdown associated with mine dewatering and subsequent filling of the open pit. Lowering of the water table in the area of these plants would potentially cause a decline in the wetland vegetation community and the associated wildlife species. The lowering of the water table would also potentially result in less water for wildlife consumption.

  Significance of the Impact: The impact would not be significant; however, the BLM has identified the following mitigation that would benefit wildlife.

- **Mitigation Measure 3.23.3.6-4:** Mitigation for the potential loss of water would include the development of six water sites (Figure 3.13.1) **that were identified for wild horses and two additional sites that would be designed specifically for wildlife use**. Although the sites **shown on Figure 3.13.1** were identified as part of mitigation to wild horses (Section 3.13), development of the sites **could** also result in indirect beneficial impacts to wildlife species throughout the Project Area. **The locations and design of the wildlife-specific water developments would be determined by the Wildlife Working Group described in the Sage Grouse Conservation Measures in Appendix D, Attachment 3.** Additional mitigation has been proposed for wetland vegetation in Section 3.11 (**M**itigation **M**easure 3.11.3.3-**3**).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measures 3.11.3.3-1 and 3.23.3.3-4 would reduce impacts to the loss of riparian habitat during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the temporary loss of riparian vegetation.

- **Impact 3.23.3.6-5:** For wildlife (terrestrial and avian), the results of the SLERA assessment indicate a low risk based on calculated species-specific toxicity criteria using more recent EPA developed TRVs. None of the chemicals of potential ecological concern identified in the predicted pit lake water poses a credible risk to wildlife that may inhabit the area and use the pit lake as a drinking water source.

  Significance of the Impact: The potential to adversely affect the health of terrestrial or avian life is considered negligible. Based on the predicted pit lake chemistry, calculated toxicity criteria, and predicted utilization of the open pit water by wildlife, the overall ecological risk from the Off-Site Transfer of Concentrate for Processing Alternative is considered to be low. The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.23.3.6.2 Special Status Wildlife Species

Impacts to special status wildlife species under this alternative would be similar to the impacts described above for the Proposed Action.

- **Impact 3.23.3.6-6:** Greater sage-grouse individuals **as well as approximately 3,544 acres of PPH and approximately 1,965 acres of PGH within the Project Area** could be impacted as a result of the Proposed Action.

  Significance of the Impact: This impact is considered potentially significant with respect to greater sage-grouse, a USFWS candidate species and a BLM sensitive species, and greater sage-grouse habitat and the following mitigation **measures have** been identified.

- **Mitigation Measure 3.23.3.6-6:** Mitigation under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be the same as mitigation under the Proposed Action (Mitigation Measure 3.23.3.3-6).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.23.3.6-6 would reduce impacts to greater sage-grouse during Project activities to less than significant through the implementation of **conservation measures and off-site mitigation** (Appendix **D, Attachment 3**).

- **Impact 3.23.3.6-7:** Approximately 8,**355** acres of migratory bird and raptor habitat would be directly removed over the 44-year mine life as a result of the Proposed Action.

  Significance of the Impact: This impact is considered potentially significant with respect to vegetation removal during the avian breeding season that results in a violation of the MBTA and the following mitigation measure has been identified.

- **Mitigation Measure 3.23.3.6-7:** Mitigation under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be the same as mitigation under the Proposed Action (Mitigation Measure 3.23.3.5-7).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.23.3.3-7 would reduce impacts to migratory birds during Project activities to less than significant by ensuring no direct impacts to nesting birds would occur.

- **Impact 3.23.3.6-8:** Loud or sudden noises associated with the Off-Site Transfer of Ore Concentrate for Processing Alternative could result in an indirect impact (i.e., disturbance) to golden eagles nesting east of the Project Area.

  Significance of the Impact: This impact is considered potentially significant with respect to Project activities during the golden eagle breeding season that may result in a violation of the Bald and Golden Eagle Protection Act and the following mitigation measure has been identified.

- **Mitigation Measure 3.23.3.6-8:** Mitigation under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be the same as mitigation under the Proposed Action (Mitigation Measure 3.23.3.3-8).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.23.3.3-8 would reduce impacts to golden eagles during Project activities to less than significant by ensuring no direct impacts to nesting birds would occur.

- **Impact 3.23.3.6-9:** Pygmy rabbit individuals and habitat could be impacted as a result of the Proposed Action.

  Significance of the Impact: This impact is not considered significant with respect to pygmy rabbits; however, the BLM proposes the following mitigation measure.

- **Mitigation Measure 3.23.3.6-9:** Mitigation under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be the same as mitigation under the Proposed Action (Mitigation Measure 3.23.3.**3-9**).

- **Effectiveness of Mitigation and Residual Effects:** Although direct effects to pygmy rabbits and their habitat would occur in the Project Area, this mitigation would ensure additional pygmy rabbit habitat is created to replace the habitat removed at a two to one ratio.

- **Impact 3.23.3.6-10:** There may be a decrease in flows within Henderson Creek, which may affect the creek's criteria for use in LCT recovery.

  Significance of the Impact: This impact is considered potentially significant with respect to a LCT recovery creek. The following mitigation has been identified by the BLM to limit the potential effect to Henderson Creek and ensure that there would not be an effect to Birch Creek or Pete Hanson Creek.

- **Mitigation Measure 3.23.3.6-10:** Mitigation under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be the same as mitigation under the Proposed Action (Mitigation Measure 3.23.3.**3-10**).

- **Effectiveness of Mitigation and Residual Effects:** Implementation of Mitigation Measure 3.2.3.3-2b and the use of any of the options outlined in Section 3.2.3 would be effective at mitigating the impacts from reduced surface water flows. The effectiveness of Mitigation Measure 3.2.3.3-2c, if implemented, is less certain since it would be many decades in the future. However, if measures used in Mitigation Measure 3.2.3.3-2b are implemented, then the measure should be effective at mitigating the impacts from reduced surface water flows. Over a long period of time (tens to **hundreds** of years) the effects to most surface water flows would diminish; however, for the springs nearest to the open pit, flows would be reduced or eliminated in perpetuity.

- **Impact 3.23.3.6-11:** Bat foraging habitat would be impacted as a result of the Partial Backfill Alternative for the duration of the Project.

  Significance of the Impact: This impact is not considered significant; however, the following mitigation is proposed.

- **Mitigation Measure 3.23.3.6-11:** In order to minimize impacts to bat habitat, prior to the initiation of Project activities, EML would close those mine workings that would be removed over the life of the Project (after bats have been evacuated) and install bat-friendly closures on openings that would not be directly impacted by the Project in order to preserve access to the remaining bat habitat (also see Appendix **D, Attachment 4**).

- **Effectiveness of Mitigation and Residual Effects:** The protection of specific mine openings in the Project Area would be effective as mitigation for the loss of habitat associated with those mines that would be removed as a result of Project activities. Bats excluded from the closed mines in the Project Area are familiar with the mine openings that would remain accessible and would take advantage of its preservation.

3.23.3.6.3 Residual Adverse Impacts

The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the unavoidable loss of 734 acres of wildlife foraging habitat resulting from surface disturbance in the open pit area. Approximately 8,**335** acres of foraging habitat would be removed in the short term, and then 7,**621** would be reclaimed as a result of mine development, operation, and closure. The reclaimed land would have more grass and forb forage and less mature shrub forage in the short term.

3.23.3.7 Slower, Longer Project Alternative

Impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action. As discussed in Section 3.2.3, the surface area predicted to be impacted by the drawdown by this alternative is similar to, but slightly different than, the Proposed Action. The differences between the predicted drawdown area is illustrated on Figure 3.2.28. Impacts to wildlife as a result of the Slower, Longer Project

Alternative are expected to be similar to the Proposed Action at the end of the Project; **however, during the Project impacts to wildlife would be greater due to the extended duration**.

3.23.3.7.1 General Wildlife

- **Impact 3.23.3.7-1:** Approximately 8,355 acres of wildlife habitat would be directly removed as a result of the Slower, Longer Project Alternative over the extended mine life.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.23.3.7-2:** Modification of wildlife habitat and subsequent reclamation efforts would result in less available mature vegetation for cover, forage, and nesting habitat for many species of wildlife for the duration of this alternative.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.23.3.7-3:** Loud and sudden noises associated with the Slower, Longer Project Alternative could result in wildlife displacement for the life of the Project.

  Significance of the Impact: The proposed Project may produce an increase greater than 10 dB above ambient noise levels, which can be detrimental to lekking greater sage-grouse. Therefore, the impact is considered significant and the following mitigation measure has been identified.

- **Mitigation Measure 3.23.3.7-3: Mitigation for noise impacts is included in Mitigation Measure 3.23.3.3-6 (as identified in the Sage Grouse Conservation Measures in Appendix D, Attachment 3) and includes noise reducing enclosures that would be installed on the Project's booster stations in Kobeh Valley as well as possible modification to the pumping regime during lekking season.**

  Effectiveness of Mitigation and Residual Effects: Implementation of Mitigation Measure 3.23.3.7-3 would be effective to reduce any impacts from noise to greater sage-grouse to less than significant.

- **Impact 3.23.3.7-4:** Wildlife dependent on vegetation growing near perennial streams, springs, and seeps would potentially experience water stress due to the water table drawdown associated with mine dewatering and subsequent filling of the open pit. Lowering of the water table in the area of these plants would potentially cause a decline in the wetland vegetation community and the associated wildlife species. The lowering of the water table would also potentially result in less water for wildlife consumption.

Significance of the Impact: The impact would not be significant; however, the BLM has identified the following mitigation that would benefit wildlife.

- **Mitigation Measure 3.23.3.7-4**: Mitigation for the potential loss of water would include the development of six water sites (Figure 3.13.1) **that were identified for wild horses and two additional sites that would be designed specifically for wildlife use**. Although the sites **shown on Figure 3.13.1** were identified as part of mitigation to wild horses (Section 3.13), development of the sites **could** also result in indirect beneficial impacts to wildlife species throughout the Project Area. **The locations and design of the wildlife-specific water developments would be determined by the Wildlife Working Group described in the Sage Grouse Conservation Measures in Appendix D, Attachment 3.** Additional mitigation has been proposed for wetland vegetation in Section 3.11 (Mitigation Measure 3.11.3.3-**3**).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measures 3.11.3.3-1 and 3.23.3.3-4 would reduce impacts to the loss of riparian habitat during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the temporary loss of riparian vegetation.

- **Impact 3.23.3.7-5:** For wildlife (terrestrial and avian), the results of the SLERA assessment indicate a low risk based on calculated species-specific toxicity criteria using more recent EPA developed TRVs. None of the chemicals of potential ecological concern identified in the predicted pit lake water poses a credible risk to wildlife that may inhabit the area and use the pit lake as a drinking water source.

  Significance of the Impact: The potential to adversely affect the health of terrestrial or avian life is considered negligible. Based on the predicted pit lake chemistry, calculated toxicity criteria, and predicted utilization of the Mount Hope open pit water by wildlife, the overall ecological risk from the Slower, Longer Project Alternative is considered to be low. The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.23.3.7.2 Special Status Wildlife Species

- **Impact 3.23.3.7-6:** Greater sage-grouse individuals **as well as approximately 3,544 acres of PPH and approximately 1,965 acres of PGH within the Project Area** could be impacted as a result of the Slower, Longer Project Alternative.

  Significance of the Impact: This impact is considered potentially significant with respect to greater sage-grouse, a USFWS candidate species and a BLM sensitive species, and greater sage-grouse habitat and the following mitigation **measures have been identified**.

- **Mitigation Measure 3.23.3.7-6:** The mitigation measures identified in the Sage Grouse **Conservation Measures** (Appendix **D, Attachment 3**).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.23.3.6-6 would reduce impacts to greater sage-grouse during Project activities to less than significant through the implementation of **conservation measures and off-site mitigation** (Appendix **D, Attachment 3**).

- **Impact 3.23.3.7-7:** Approximately 8,355 acres of migratory bird and raptor habitat would be directly removed over the extended mine life as a result of the Slower, Longer Project Alternative.

  Significance of the Impact: This impact is considered potentially significant with respect to vegetation removal during the avian breeding season that results in a violation of the MBTA and the following mitigation is proposed.

- **Mitigation Measure 3.23.3.7-7:** Land clearing would be conducted outside the avian breeding season. If this is not possible, then a qualified biologist would survey the area to be cleared prior to clearing. If active nests were identified, or if other evidence of nesting (mated pairs, territorial defense, carrying nesting material, transporting food) was observed as a result of this survey, then a protective buffer (the size of which would depend on the requirements of the species) would be delineated and the delineated protective buffer avoided to prevent destruction or disturbance to nests until the nests were no longer active or nesting activities were no longer observed.

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.23.3.3-7 would reduce impacts to migratory birds during Project activities to less than significant by ensuring no direct impacts to nesting birds would occur.

- **Impact 3.23.3.7-8:** Loud or sudden noises associated with the Slower, Longer Project Alternative could result in an indirect impact (i.e., disturbance) to golden eagles nesting east of the Project Area.

  Significance of the Impact: This impact is considered potentially significant with respect to Project activities during the golden eagle breeding season that may result in a violation of the Bald and Golden Eagle Protection Act and the following mitigation measure has been identified.

- **Mitigation Measure 3.23.3.7-8:** Mitigation under the Slower, Longer Project Alternative would be the same as mitigation under the Proposed Action (Mitigation Measure 3.23.3.3-8).

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.23.3.3-8 would reduce impacts to golden eagles during Project activities to less than significant by ensuring no direct impacts to nesting birds would occur.

- **Impact 3.23.3.7-9:** Pygmy rabbit individuals and habitat could be impacted as a result of the Proposed Action.

  Significance of the Impact: This impact is not considered significant with respect to pygmy rabbits; however, the BLM proposes the following mitigation measure.

- **Mitigation Measure 3.23.3.7-9:** Mitigation under the Slower, Longer Project Alternative would be the same as mitigation under the Proposed Action (Mitigation Measure 3.23.3.3-**9**).

- **Effectiveness of Mitigation and Residual Effects:** Although direct effects to pygmy rabbits and their habitat would occur in the Project Area, this mitigation would ensure additional pygmy rabbit habitat is created to replace the habitat removed at a two to one ratio.

- **Impact 3.23.3.7-10:** There may be a decrease in flows within Henderson Creek, which may affect the creek's criteria for use in LCT recovery.

  Significance of the Impact: This impact is considered potentially significant with respect to a LCT recovery creek. The following mitigation has been identified by the BLM to limit to potential effects to Henderson Creek and to ensure that there would not be an effect to Birch Creek or Pete Hanson Creek.

- **Mitigation Measure 3.23.3.7-10:** The mitigation measure identified in Section 3.2.3 to ensure that the development of the ten-foot drawdown contour is consistent with the analysis in this EIS (Mitigation Measure 3.2.3.3-2a and 3.2.3.3-2b) would be sufficient to mitigate the impact to LCT from the Proposed Action.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of Mitigation Measure 3.2.3.3-2b and the use of any of the options outlined in Section 3.2.3 would be effective at mitigating the impacts from reduced surface water flows. The effectiveness of Mitigation Measure 3.2.3.3-2c, if implemented, is less certain since it would be many decades in the future. However, if measures used in Mitigation Measure 3.2.3.3-2b are implemented, then the measure should be effective at mitigating the impacts from reduced surface water flows. Over a long period of time (tens to **hundreds** of years) the effects to most surface water flows would diminish; however, for the springs nearest to the open pit, flows would be reduced or eliminated in perpetuity.

- **Impact 3.23.3.7-11:** Bat foraging habitat would be impacted as a result of the Slower, Longer Project Alternative for the duration of the Project.

  Significance of the Impact: This impact is not considered significant; however, the following mitigation is proposed.

- **Mitigation Measure 3.23.3.7-11:** In order to minimize impacts to bat habitat, prior to the initiation of Project activities, EML would close those mine workings that would be removed over the life of the Project (after bats have been evacuated) and install bat-friendly closures on openings that would not be directly impacted by the Project in order to preserve access to the remaining bat habitat (also see Appendix **D, Attachment 4**).

- **Effectiveness of Mitigation and Residual Effects:** The protection of specific mine openings in the Project Area would be effective as mitigation for the loss of habitat associated with those mines that would be removed as a result of Project activities. Bats excluded from the closed mines in the Project Area are familiar with the mine openings that would remain accessible and would take advantage of its preservation.

3.23.3.7.3 Residual Adverse Impacts

The Slower, Longer Project Alternative would result in the unavoidable loss of 734 acres of terrestrial wildlife habitat resulting from surface disturbance in the open pit area. Approximately 7,621 acres of wildlife habitat would be removed over the course of this alternative and then reclaimed as a result of mine development, operation, and closure. The reclaimed land would have more grass and forb forage and less mature shrub forage. Browsers would benefit the most from the early seral stage vegetation immediately following reclamation. As the plant communities within the Project Area mature, larger shrubs would provide additional cover for larger animals and less of a forage prey base for raptors, similar to the existing conditions. In addition, the impacts from this alternative would create prolonged habitat disturbance on wildlife.

3.24 Transportation and Access

3.24.1 Regulatory Framework

The transportation system associated with, and in the vicinity of, the Project consists of a network of roads that are maintained by Eureka County, the NDOT, **the** BLM, or are existing roads on public lands that are not maintained.

Public lands under BLM jurisdiction are managed "...on the basis of multiple use and sustained yield unless otherwise specified by law" (Sec. 102 (a) (7), FLPMA). Under the FLPMA, access to public lands is generally considered open, unless the BLM RMP has designated otherwise. All public lands in the vicinity of the Project Area, except for the Roberts Mountain WSA are in an open status.

3.24.2 Affected Environment

3.24.2.1 Study Methods

The baseline data presented below is based on information from the Plan, **the** NDOT, and the MLFO files.

3.24.2.2 Existing Conditions

Transportation

On the eastern boundary of the Project Area SR 278 traverses the Project Area from north to south. This paved route connects the communities of Eureka and Carlin. To the south of the Project Area, the Town of Eureka is situated on U.S. Highway 50, which is one of the two-lane east-west highways that cross the US. To the north of the Project Area, the City of Carlin is situated on I-80, which is one of the major east-west four-lane interstate highways that cross the U.S. SR 278 had an average daily traffic volume **in 2010** of **570** vehicle trips per day **north of the Project Area in the northern portion of Pine Valley and 490 vehicle trips per day south of the Project Area near the junction with U.S. Highway 50**, 175 of which were trucks in 2010 (NDOT 2011). U.S. Highway 50 had an average daily traffic volume of 1,000 vehicles, 130 of which were trucks in 2010 (NDOT 2011). **Since the NDOT collected these data, the Ruby Hill Mine has added approximately 26 truck trips per day on SR 278. In 2010 there were**

119 vehicle crashes, 28 of which involved injuries or deaths. There were seven deaths that resulted from seven crashes. Five of those crashes were non-collision crashes and none of them were head-on crashes (NDOT 2011).

Access

Primary access within Eureka County is furnished by I-80, U.S. Highway 50, SR 278, **SR 379,** county roads, and public access roads. The majority of public lands are accessible to the general public via one of these roads. I-80 and U.S. Highway 50 are the primary east-west highways in north-central Nevada. SR 278 is the main north-south corridor through Eureka County, connecting the Town of Eureka (along U.S. Highway 50) and the City of Carlin (along I-80).

The Project Area is reached from I-80 by traveling approximately 65 miles south on SR 278 along Pine Valley to Garden Pass. The Project is located on the west side of SR 278 immediately south of Garden Pass. The Project Area can also be reached from the intersection of U.S. Highway 50 by traveling north on SR 278 through Diamond Valley for approximately 23 miles. From SR 278, a number of dirt roads can be used to access the Project, which is located one mile west of SR 278.

3.24.3 Environmental Consequences

3.24.3.1 Significance Criteria

The Proposed Action would normally have a significant effect on transportation and access if the following would occur:

- Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the roadway system; or
- Prevent or substantially reduce access to public land through the elimination of existing routes of travel.

3.24.3.2 Assessment Methodology

To evaluate impacts to transportation and access, the Proposed Action and alternatives are reviewed against existing conditions and local transportation plans. The significance criteria are then applied to determine if the adverse effects would be considered significant impacts if the Project or an alternative were implemented.

3.24.3.3 Proposed Action

The Project would employ a substantial number of personnel for administration and the **construction and** operation of mining and production equipment; however, through the use of buses to transport workers from the communities in the area (Eureka, Carlin, Elko), traffic pressure on SR 278 would be minimized. The Project would also require additional deliveries of some hazardous chemicals to the Project Area, which are discussed in Section 3.**19**.

Construction-related transportation would result in estimated peak traffic counts that are projected to occur in Month 10 of construction, currently expected to be September 2013. During this month, the estimated traffic would include approximately 3,600 round-trips

(trucks and commuting labor) from Eureka (and Diamond Valley), approximately 3,200 round-trips from the I-80 corridor, approximately 650 round-trips from the east on U.S. Highway 50 and approximately 400 round-trips from the west on U.S. Highway 50. On a percentage basis, this increase in traffic would be up to approximately 540 percent increase on SR 278 north of the Project Area, 700 percent on SR 278 south of the Project Area, and 150 percent increase on U.S. Highway 50. Over the 24-month construction period, the first approximately six month the traffic would be approximately ten to 25 percent of the peak volumes and the last seven months would be approximately 40 to 70 percent of the peak volumes. During this construction period the level of service on SR 278 is likely to be degraded.

During construction, materials transported to the Project site would include gravel currently stockpiled at the privately owned Romano Ranch that would be used as aggregate in concrete. The Romano Ranch is located in Diamond Valley, and aggregate would be hauled by truck approximately seven miles on the Sadler Brown gravel road to the intersection of SR 278, then north approximately three miles to the main access road.

During the construction phase of the Project a minor percentage of the construction traffic would use the Roberts Creek Road for the construction activities associated with the Project well field.

- **Impact 3.24.3.3-1: For the 18- to 24-month construction period of the Project, there would be a peak increase in traffic from trucks, cars, pickup trucks, vans, and buses of between 150 and 700 percent over the existing traffic volumes on SR 278 and U.S. Highway 50.**

  Significance of the Impact: The impact is considered significant. SR 278 and U.S. Highway 50 are public roads that are maintained by the NDOT, and the NDOT has jurisdiction over these routes. The Roberts Creek Road is a public road maintained by Eureka County and Eureka County has jurisdiction over this route. It is beyond the BLM's jurisdiction to impose mitigation measures for activities on these public roads. See Section 3.26 of this EIS.

Operations-related transportation for the Project would result in approximately 26 daily truck trips, including the toll roasting, which would create an approximately 13 percent increase in truck traffic **on SR 278. For the purpose of analysis in this EIS it is assumed the 370 employees (average number) would commute to the Project in 100 cars, six vans, and two buses, and that half the vehicles would come from the north (Carlin) and half would come from the south (Eureka). This would result in an estimated increase in non-truck traffic of between approximately 26 and 34 percent on SR 278, and an estimated increase in non-truck traffic of approximately 12 percent on U.S.** Highway 50.

- **Impact 3.24.3.3-2:** For the life of the Project, which could be up to 70 years, there would be an increase in trucks (approximately 13 percent) **on SR 278** and **an increase in** car, **pickup, van, and bus** traffic **of between 26 and 34 percent** on SR 278 and **12 percent on** U.S. Highway 50.

  Significance of the Impact: The impact is not considered significant. **SR 278 and U.S. Highway 50 are public roads that are maintained by the NDOT, and the NDOT has**

jurisdiction over these routes. It is beyond the BLM's jurisdiction to impose mitigation measures for activities on these public roads. See Section 3.26 of this EIS.

The public may also access the Roberts Mountains for dispersed recreation opportunities (hunting or OHV use) by using the Henderson-Roberts Creek Road, also known as the Old Pony Express Trail, which is the 1980s re-route of the original trail. This road is located on the west side of Mount Hope and traverses through Henderson Summit to connect with SR 278 approximately four miles north of Mount Hope. The designated Pony Express Trail is located on the south side of Mount Hope. Impacts of the Proposed Action on the Pony Express Trail are discussed in Section 3.21. For the life of the Project, which could be up to 70 years, access through the Project Area would be restricted.

Public access routes to areas near and beyond the Project Area would not be impacted by the Proposed Action. Public access to surrounding areas would remain available throughout the construction, mining, and reclamation phases of the Project. All haul and access roads constructed by EML under the Proposed Action would be reclaimed following the completion of mining and processing. The Proposed Action would not otherwise impact access.

- **Impact 3.24.3.3-3:** For the life of the Project, which could be up to 70 years, access through the Project Area would be restricted. Public access to surrounding areas would remain available throughout the construction, mining, and reclamation phases of the Project.

Significance of the Impact: This impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.24.3.3.1 Residual Adverse Impacts

The Proposed Action would result in the unavoidable loss of 734 acres of public lands utilized for **wildlife habitat, wild horses and** livestock grazing**, dispersed recreation (including hunting),** and mineral exploration **among other potential uses** resulting from surface disturbance associated with the open pit. There would be no residual impact to access resulting from the Proposed Action. The Proposed Action would have the unavoidable, but reversible, indirect potential to adversely affect access through the Project Area and increase use of the transportation system for the life of the Project.

3.24.3.4 No Action Alternative

Under the No Action Alternative, EML is currently authorized under **seven** Notices to disturb approximately **35** acres of public land as a result of the exploration and development of the Project. Facilities and operations that have been approved but not yet completed would have impacts on transportation and access. Public lands managed for multiple uses within the Project Area that have been proposed for surface disturbance and fencing would remain accessible.

No additional public lands would be removed from multiple use management, and impacts to land use would be limited to ongoing permitted mining and exploration activities. There would be no impacts to access beyond existing conditions resulting from the approved Notices.

3.24.3.4.1 Residual Adverse Impacts

There would be no residual impacts to transportation and access under the No Action Alternative, other than those impacts caused by authorized Notice-level operations at the Project. The impacts to access caused by existing operations at the Project are considered temporary, and no residual adverse impacts are anticipated.

3.24.3.5 Partial Backfill Alternative

The Project would employ a substantial number of personnel for administration and the **construction and** operation of mining and production equipment; however, through the use of buses to transport workers from the communities in the area (Eureka, Carlin, Elko), traffic pressure to SR 278 would be minimized. The Project would also require additional deliveries of some hazardous chemicals to the Project Area, which are discussed in Section 3.20.

Construction-related transportation would result in estimated peak traffic counts that are projected to occur in Month 10 of construction, currently expected to be September 2013. During this month, the estimated traffic would include approximately 3,600 round-trips (trucks and commuting labor) from Eureka (and Diamond Valley), approximately 3,200 round-trips from the I-80 corridor, approximately 650 round-trips from the east on U.S. Highway 50 and approximately 400 round-trips from the west on U.S. Highway 50. On a percentage basis, this increase in traffic would be up to approximately 540 percent increase on SR 278 north of the Project Area, 700 percent on SR 278 south of the Project Area, and 150 percent increase on U.S. Highway 50. Over the 24-month construction period, the first approximately six month the traffic would be approximately ten to 25 percent of the peak volumes and the last seven months would be approximately 40 to 70 percent of the peak volumes. During this construction period the level of service on SR 278 is likely to be degraded.

During the construction phase of the Project a minor percentage of the construction traffic would use the Roberts Creek Road for the construction activities associated with the Project well field.

During construction, materials transported to the Project site would include gravel currently stockpiled at the privately owned Romano Ranch that would be used as aggregate in concrete. The Romano Ranch is located in Diamond Valley, and aggregate would be hauled by truck approximately seven miles on the Sadler Brown gravel road to the intersection of SR 278, then north approximately three miles to the main access road.

- **Impact 3.24.3.5-1: For the 18- to 24-month construction period of the Project, there would be a peak increase in traffic from trucks, cars, pickup trucks, vans, and buses of between 150 and 700 percent over the existing traffic volumes on SR 278 and U.S. Highway 50.**

  Significance of the Impact: The impact is considered significant. SR 278 and U.S. Highway 50 are public roads that are maintained by the NDOT, and the NDOT has jurisdiction over these routes. The Roberts Creek Road is a public road maintained by Eureka County and Eureka County has jurisdiction over this route. It is beyond

the BLM's jurisdiction to impose mitigation measures for activities on these public roads. See Section 3.26 of this EIS.

Operations-related transportation for the Project would result in approximately 26 daily truck trips, including the toll roasting, which would create an approximately 13 percent increase in truck traffic. For the purpose of analysis in this EIS it is assumed the 370 employees (average number) would commute to the Project in 100 cars, six vans, and two buses, and that half the vehicles would come from the north (Carlin) and half would come from the south (Eureka). This would result in an estimated increase in non-truck traffic of between approximately 26 and 34 percent on SR 278, and an estimated increase in non-truck traffic of approximately 12 percent on U.S. Highway 50.

- **Impact 3.24.3.5-2:** For the life of the Project, which could be up to 70 years, there would be an increase in trucks (approximately 13 percent) **on SR 278 and an increase in car, pickup, van, and bus traffic of between 26 and 34 percent on SR 278 and 12 percent on** U.S. Highway 50.

  Significance of the Impact: This impact is not considered less than significant. **SR 278 and U.S. Highway 50 are public roads that are maintained by the NDOT, and the NDOT has jurisdiction over these routes. It is beyond the BLM's jurisdiction to impose mitigation measures for activities on these public roads. See Section 3.26 of this EIS.**

The public may also access the Roberts Mountains for dispersed recreation opportunities (hunting or OHV use) by using the Henderson-Roberts Creek Road, also known as the Old Pony Express Trail, which is the 1980s re-route of the original trail. This road is located on west side of Mount Hope and traverses through Henderson Summit to connect with SR 278 approximately four miles north of Mount Hope. The designated Pony Express Trail is located on the south side of Mount Hope. Impacts of the Proposed Action on the Pony Express Trail are discussed in Section 3.21. For the life of the Project, which could be up to 70 years, access through the Project Area would be restricted.

Public access routes to areas near and beyond the Project Area would not be impacted by the Proposed Action. Public access to surrounding areas would remain available throughout the construction, mining, and reclamation phases of the Project. All other haul and access roads constructed by EML under the Proposed Action would be reclaimed following the completion of mining. The Partial Backfill Alternative would not otherwise impact access.

- **Impact 3.24.3.5-3:** For the life of the Project, which could be up to 70 years, access through the Project Area would be restricted. Public access to surrounding areas would remain available throughout the construction, mining, and reclamation phases of the Project.

  Significance of the Impact: This impact is considered less than significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.24.3.5.1 Residual Adverse Impacts

The Partial Backfill Alternative would result in the unavoidable loss of 734 acres of public lands utilized for **wildlife habitat, wild horses and** livestock grazing**, dispersed recreation (including hunting),** and mineral exploration **among other potential uses** resulting from surface disturbance of the open pit area. There would be no residual adverse impact to access resulting from the Partial Backfill Alternative. Similar to the Proposed Action, the Partial Backfill Alternative would have the unavoidable indirect potential to adversely affect access through the Project Area for the duration of the Project.

3.24.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

The Project would employ a substantial number of personnel for administration and the **construction and** operation of mining and production equipment; however, through the use of buses to transport workers from the communities in the area (Eureka, Carlin, Elko), traffic pressure to SR 278 would be minimized. The Project would also require additional deliveries of some hazardous chemicals to the Project Area, which are discussed in Section 3.20.

Construction-related transportation would result in estimated peak traffic counts that are projected to occur in Month 10 of construction, currently expected to be September 2013. During this month, the estimated traffic would include approximately 3,600 round-trips (trucks and commuting labor) from Eureka (and Diamond Valley), approximately 3,200 round-trips from the I-80 corridor, approximately 650 round-trips from the east on U.S. Highway 50 and approximately 400 round-trips from the west on U.S. Highway 50. On a percentage basis, this increase in traffic would be up to approximately 540 percent increase on SR 278 north of the Project Area, 700 percent on SR 278 south of the Project Area, and 150 percent increase on U.S. Highway 50. Over the 24-month construction period, the first approximately six month the traffic would be approximately ten to 25 percent of the peak volumes and the last seven months would be approximately 40 to 70 percent of the peak volumes. During this construction period the level of service on SR 278 is likely to be degraded.

During the construction phase of the Project a minor percentage of the construction traffic would use the Roberts Creek Road for the construction activities associated with the Project well field.

During construction, materials transported to the Project site would include gravel currently stockpiled at the privately owned Romano Ranch that would be used as aggregate in concrete. The Romano Ranch is located in Diamond Valley, and aggregate would be hauled by truck approximately seven miles on the Sadler Brown gravel road to the intersection of SR 278, then north approximately three miles to the main access road.

- **Impact 3.24.3.6-1: For the 18- to 24-month construction period of the Project, there would be a peak increase in traffic from trucks, cars, pickup trucks, vans, and buses of between 150 and 700 percent over the existing traffic volumes on SR 278 and U.S. Highway 50.**

  Significance of the Impact: The impact is considered significant. SR 278 and U.S. Highway 50 are public roads that are maintained by the NDOT, and the NDOT has

jurisdiction over these routes. The Roberts Creek Road is a public road maintained by Eureka County and Eureka County has jurisdiction over this route. It is beyond the BLM's jurisdiction to impose mitigation measures for activities on these public roads. See Section 3.26 of this EIS.

Operations-related transportation for the Project would result in approximately 26 daily truck trips, including the toll roasting, which would create an approximately 13 percent increase in truck traffic. For the purpose of analysis in this EIS it is assumed the 370 employees (average number) would commute to the Project in 100 cars, six vans, and two buses, and that half the vehicles would come from the north (Carlin) and half would come from the south (Eureka). This would result in an estimated increase in non-truck traffic of between approximately 26 and 34 percent on SR 278, and an estimated increase in non-truck traffic of approximately 12 percent on U.S. Highway 50.

- **Impact 3.24.3.6-2:** For the life of the Project, which could be up to 70 years, there would be an increase in trucks (approximately 13 percent) **on SR 278 and an increase in car, pickup, van, and bus traffic of between 26 and 34 percent on SR 278 and 12 percent on** U.S. **Highway** 50.

Significance of the Impact: This impact is considered less than significant. **SR 278 and U.S. Highway 50 are public roads that are maintained by the NDOT, and the NDOT has jurisdiction over these routes. It is beyond the BLM's jurisdiction to impose mitigation measures for activities on these public roads (see Section 3.26 of this EIS).**

The public may also access the Roberts Mountains for dispersed recreation opportunities (hunting or OHV use) by using the Henderson-Roberts Creek Road, also known as the Old Pony Express Trail, which is the 1980s re-route of the original trail. This road is located on the west side of Mount Hope and traverses through Henderson Summit to connect with SR 278 approximately four miles north of Mount Hope. The designated Pony Express Trail is located on the south side of Mount Hope. Impacts of the Off-Site Transfer of Ore Concentrate for Processing Alternative on the Pony Express Trail are discussed in Section 3.21. For the life of the Project, which could be up to 70 years, access through the Project Area would be restricted.

Public access routes to areas near and beyond the Project Area would not be impacted by the Off-Site Transfer of Ore Concentrate for Processing Alternative. Public access to surrounding areas would remain available throughout the construction, mining, and reclamation phases of the Project. All other haul and access roads constructed by EML under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be reclaimed following the completion of mining. The Off-Site Transfer of Ore Concentrate for Processing Alternative would not otherwise impact access.

- **Impact 3.24.3.6-3:** For the life of the Project, which could be up to 70 years, access through the Project Area would be restricted. Public access to surrounding areas would remain available throughout the construction, mining, and reclamation phases of the Project.

Significance of the Impact: This impact is considered less than significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.24.3.6.1 Residual Adverse Impacts

The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the unavoidable loss of 734 acres of public lands utilized for **wildlife habitat, wild horses and** livestock grazing**, dispersed recreation (including hunting),** and mineral exploration **among other potential uses** resulting from surface disturbance of the open pit area. There would be no residual adverse impact to access resulting from the Off-Site Transfer of Ore Concentrate for Processing Alternative. Similar to the Proposed Action, the Off-Site Transfer of Ore Concentrate for Processing Alternative would have the unavoidable indirect potential to adversely affect access through the Project Area for the duration of the Project.

3.24.3.7 Slower, Longer Project Alternative

The Project would employ a substantial number of personnel for administration and the **construction and** operation of mining and production equipment; however, through the use of buses to transport workers from the communities in the area (Eureka, Carlin, Elko), traffic pressure to SR 278 would be minimized. The Project would also require additional deliveries of some hazardous chemicals to the Project Area, which are further discussed in Section 3.20.

Construction-related transportation would result in estimated peak traffic counts that are projected to occur in Month 10 of construction, currently expected to be September 2013. During this month, the estimated traffic would include approximately 3,600 round-trips (trucks and commuting labor) from Eureka (and Diamond Valley), approximately 3,200 round-trips from the I-80 corridor, approximately 650 round-trips from the east on U.S. Highway 50 and approximately 400 round-trips from the west on U.S. Highway 50. On a percentage basis, this increase in traffic would be up to approximately 540 percent increase on SR 278 north of the Project Area, 700 percent on SR 278 south of the Project Area, and 150 percent increase on U.S. Highway 50. Over the 24-month construction period, the first approximately six month the traffic would be approximately ten to 25 percent of the peak volumes and the last seven months would be approximately 40 to 70 percent of the peak volumes. During this construction period the level of service on SR 278 is likely to be degraded.

During the construction phase of the Project a minor percentage of the construction traffic would use the Roberts Creek Road for the construction activities associated with the Project well field.

During construction, materials transported to the Project site would include gravel currently stockpiled at the privately owned Romano Ranch that would be used as aggregate in concrete. The Romano Ranch is located in Diamond Valley, and aggregate would be hauled by truck approximately seven miles on the Sadler Brown gravel road to the intersection of SR 278, then north approximately three miles to the main access road.

- **Impact 3.24.3.7-1: For the 18- to 24-month construction period of the Project, there would be a peak increase in traffic from trucks, cars, pickup trucks, vans, and buses**

of between 150 and 700 percent over the existing traffic volumes on SR 278 and U.S. Highway 50.

Significance of the Impact: The impact is considered significant. SR 278 and U.S. Highway 50 are public roads that are maintained by the NDOT, and the NDOT has jurisdiction over these routes. The Roberts Creek Road is a public road maintained by Eureka County and Eureka County has jurisdiction over this route. It is beyond the BLM's jurisdiction to impose mitigation measures for activities on these public roads. See Section 3.26 of this EIS.

Operations-related transportation for the Project would result in approximately 13 daily truck trips, including the toll roasting, which would create an approximately six percent increase in truck traffic. For the purpose of analysis in this EIS it is assumed the 260 employees (average number), under the Slower, Longer Project Alternative, would commute to the Project in 70 cars, four vans, and two buses, and that half the vehicles would come from the north (Carlin) and half would come from the south (Eureka). This would result in an estimated increase in non-truck traffic of between approximately 18 and 23 percent on SR 278, and an estimated increase in non-truck traffic of approximately six percent on U.S. Highway 50.

- **Impact 3.24.3.7-2:** For the life of the Project, which could be up to **114** years, there would be an increase in trucks (approximately **six** percent) **on SR 278 and an increase in car, pickup, van, and bus traffic of between 18 and 23 percent on SR 278 and six percent on** U.S. Highway 50.

  Significance of the Impact: This impact is considered less than significant. **SR 278 and U.S. Highway 50 are public roads that are maintained by the NDOT, and the NDOT has jurisdiction over these routes. It is beyond the BLM's jurisdiction to impose mitigation measures for activities on these public roads. See Section 3.26 of this EIS.**

The public may also access the Roberts Mountains for dispersed recreation opportunities (hunting or OHV use) by using the Henderson-Roberts Creek Road, also known as the Old Pony Express Trail, which is the 1980s re-route of the original trail. This road is located on the west side of Mount Hope and traverses through Henderson Summit to connect with SR 278 approximately four miles north of Mount Hope. The designated Pony Express Trail is located on the south side of Mount Hope. Impacts of the Slower, Longer Project Alternative on the Pony Express Trail are discussed in Section 3.21. For the life of the Project, which could be up to twice as long (Approximately 115 years) as the Proposed Action, access through the Project Area would be restricted.

Public access routes to areas near and beyond the Project Area would not be impacted by the Slower, Longer Project Alternative. Public access to surrounding areas would remain available throughout the construction, mining, and reclamation phases of the Project. All other haul and access roads constructed by EML under the Slower, Longer Project Alternative would be reclaimed following the completion of mining. The Slower, Longer Project Alternative would not otherwise impact access.

- **Impact 3.24.3.7-3:** For the life of the Project, which could be up to twice as long (approximately 115 years) as the Proposed Action, access through the Project Area would

be restricted. Public access to surrounding areas would remain available throughout the construction, mining, and reclamation phases of the Project.

Significance of the Impact: This impact is considered less than significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.24.3.7.1 Residual Adverse Impacts

The Slower, Longer Project Alternative would result in the unavoidable loss of 734 acres of public lands utilized for **wildlife habitat, wild horses and** livestock grazing**, dispersed recreation (including hunting),** and mineral exploration **among other potential uses** resulting from surface disturbance associated with the open pit. There would be no residual impact to access resulting from the Slower, Longer Project Alternative. This alternative would have the unavoidable, but reversible, indirect potential to adversely affect access through the Project Area for the life of the Project.

3.25 Forest Products

3.25.1 Regulatory Framework

The 43 CFR 5400 regulates the sale of forest products harvested from public lands.

3.25.2 Affected Environment

Study Methods

The NRCS soil surveys were reviewed to obtain existing vegetation data for the area and potential natural vegetation and ecological site descriptions (SRK 2007b). A gross scale mapping effort of the vegetation in the majority of the Project was conducted by aerial survey (helicopter) on April 28, 2006, and ground surveys (SRK 2007b). UTM coordinates were obtained for boundaries between plant communities. An additional survey for biological resources, including vegetation, was conducted on July 1 and 2, 2008 (Great Basin Ecology 2008). The BLM provided information of the known woodland product harvesting in the Project Area.

3.25.2.1 Existing Conditions

Singleleaf piñon and Utah juniper woodlands provide the majority of the forest products occurring in the BLM MLFO area. Piñon-juniper woodlands are currently located in the northern, central, and southeastern portions of the proposed mine area. Forest products come from the following activities in the Project Area: pine nut harvesting; fence posts; fuel wood (e.g., greenwood and dead wood); and Christmas tree cutting. Approximately 12,**795** acres of vegetation containing a singleleaf piñon and Utah juniper component are located in the Project Area (Table 3.9-1). Forest product harvesting is not permitted in WSAs.

3.25.2.1.1 Greenwood Cutting

Personal greenwood cutting can occur where cutting of live trees is permitted. Commercial greenwood cutting is allowed on a case-by-case basis by the BLM. The most common uses of greenwood cutting products are fence posts and fuel wood. Commercial fuel wood harvesting can occur in the vicinity of the Project Area.

3.25.2.1.2 Pine Nut Harvest

The public can collect up to 25 pounds of piñon pine nuts each year with no cost or permit being required. A permit is required to collect more than 25 pounds annually. The majority of public lands administered by the BLM are open to the general public for pine nut collection. All pine nuts that are intended for resale require a permit/contract with the BLM. The Nevada BLM has designated commercial sale areas which are advertised for sale each year in August. The Project is located within the Whistler/Sulfur Springs and Roberts Commercial Pine Nut Sale Areas (Figure 3.25.1).

3.25.2.1.3 Christmas Tree Cutting

Christmas tree cutting occurs in the vicinity of the Project Area. Christmas tree permits are available from the BMDO. Piñon pine and Utah juniper are the only trees that can be cut on BLM-administered lands in Nevada. Christmas trees may be cut anywhere on BLM land within the BMDO boundaries except in WSAs. Commercial Christmas tree harvesting can occur in the vicinity of the Project Area.

3.25.3 Environmental Consequences and Mitigation Measures

The environmental consequences of the Proposed Action and each alternative as they relate to forestry products are discussed in this section.

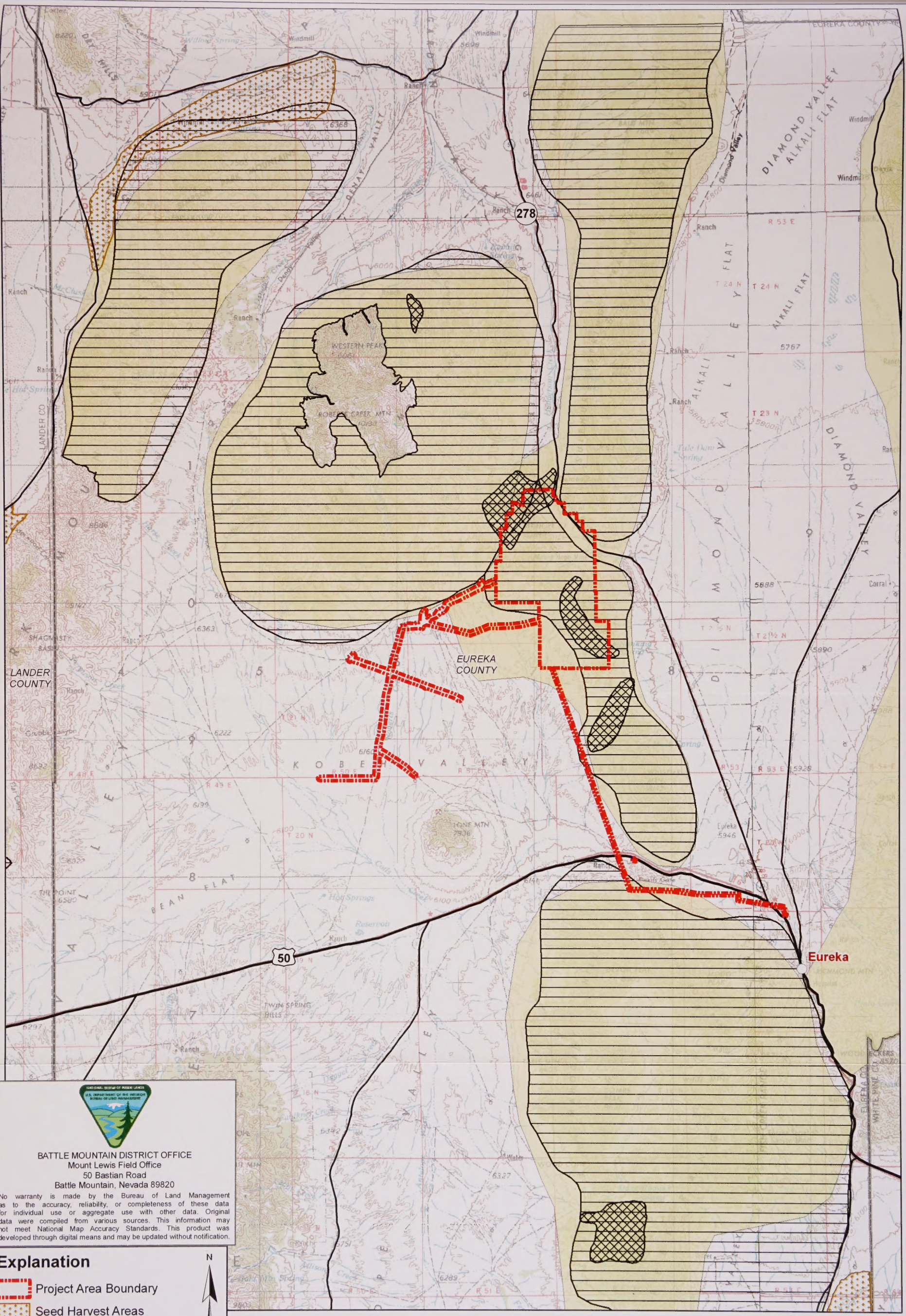
3.25.3.1 Significance Criteria

Based upon NEPA guidelines and commonly accepted criteria, the Proposed Action or alternatives would normally be considered to have a significant effect on forestry products if the following occurred:

- Substantially affect greenwood cutting, pine nut harvesting, or Christmas tree cutting; or
- Area is somehow rendered unsuitable for traditional use.

3.25.3.2 Assessment Methodology

Potential effects on forestry products can be categorized as direct and indirect, as well as short term (i.e., during the life of the Project) and long term. Direct effects on forestry products would include temporary and permanent loss of singleleaf piñon and Utah juniper associated with construction, operation, and maintenance of the Project. Indirect effects could include degradation of habitat due to trampling, soil compaction, water table decline, spills, increased access, and introduction of noxious weeds. Short-term impacts are those that could occur during Project implementation and until reclamation is complete. Long-term impacts are those occurring



BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Explanation

- Project Area Boundary
- Seed Harvest Areas
- Green Wood Cutting Areas
- Commercial Christmas Tree Cutting Areas
- Commercial Pine Nut Harvest Areas

N

0 2 4 6 8 Miles

DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD	
CHECKED: -	APPROVED: RFD	DATE: 08/01/2012	
FILE NAME: p1635_Fig3.25.1_ForestryProducts.mxd			

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Forest Products in the Mount Hope Project Area

Figure 3.25.1

after reclamation is complete. The effects are determined to be significant or not significant based on the applicable significance criteria listed in Section 3.25.3.1.

3.25.3.3 Proposed Action

Implementation of the Proposed Action would result in the temporary disturbance of 8,355 acres of vegetation over the 44-year mine life. Approximately 3,296 acres of vegetation with a singleleaf piñon component would be impacted by the Proposed Action within the Project Area (Table 3.9-4).

The Proposed Action would result in the conversion of tree- and shrub-dominated vegetation types in the Project Area to grass/forb-dominated vegetation types following reclamation. Over the long term, shrubs and trees would become reestablished and increase in abundance within the majority of disturbed areas as a result of reclamation and natural recolonization. Due to timing of the Project development and concurrent reclamation, the total acreage of vegetation disturbed would not occur all at one time. Upon completion of the Project, the reclamation portion of the Proposed Action would be completed for 7,621 acres (91 percent of the disturbed area). Approximately 734 acres of vegetation in the vicinity of the open pit would be removed and not reclaimed.

The removal of 3,296 acres of singleleaf piñon and Utah juniper trees would be a long-term impact, since it would take approximately 75 to 100 years for mature woodland to become reestablished in the disturbance areas. Of the 3,296 acres of total disturbance in piñon-juniper vegetation, approximately 734 acres of piñon-juniper woodland would be permanently lost due to the development of the open pit. The long-term change in vegetation and loss of woodland productivity would not result in significant impacts to woodland products since the Proposed Action is located in an area where abundant singleleaf piñon and Utah juniper exist on public lands.

Reclamation and revegetation would minimize the aforementioned impacts to vegetation. A total of 7,621 acres (or 91 percent of the disturbed area) would eventually be revegetated. Only the 734 acres of the open pit would remain unvegetated. Revegetation activities would be conducted as outlined in Section 2.1.17. Reclamation seed mixtures and application rates, based on BLM requirements, are shown in Tables 2.1-9 and 2.1-10.

- **Impact 3.25.3.3-1:** Disturbance or removal of 3,296 acres of vegetation with a singleleaf piñon and Utah juniper component would occur as a result of the Proposed Action.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.25.3.3.1 Residual Adverse Impacts

Residual adverse impacts to forestry products would include the permanent loss of vegetative productivity from approximately 734 acres of land associated with the open pit that would not be reclaimed and a long-term change in vegetation composition (i.e., tree and shrub dominated

communities to grass and forb dominated communities) as a result of Project development and operation.

Residual adverse impacts to woodland products would result from the long-term loss of approximately 3,**296** acres of vegetation communities containing a singleleaf piñon and Utah juniper component on BLM administered land. Woodland products from these areas would not be available until mature trees had become reestablished, which would take approximately 75 to 100 years. Of the 3,**296** acres of total disturbance in vegetation with a singleleaf piñon and Utah juniper component, approximately 734 acres of singleleaf piñon and Utah juniper would be permanently lost with the development of the open pit.

3.25.3.4 No Action Alternative

Under the No Action Alternative, the proposed Project would not be developed and associated impacts to forestry products would not occur. EML would continue existing activities under previously permitted Notices, and the area would remain available for future mineral development or for other purposes as approved by the BLM. Under the No Action Alternative, EML would continue to conduct mineral exploration and data acquisition within the Project Area. Ongoing reclamation would help to minimize impacts to vegetation through continuation of current and ongoing activities, with resulting short-term impacts to herbaceous species and long-term impacts to woody species.

- **Impact 3.25.3.4-1: Implementation of the No Action Alternative would result in the removal of vegetation including forest products.**

  Significance of the Impact: The impact is not considered significant.

3.25.3.4.1 Residual Adverse Impacts

The No Action Alternative would have the unavoidable long-term impacts to piñon-juniper as part of surface disturbance associated with permitted exploration and data acquisition; however, revegetation and reclamation would minimize these impacts to forestry products.

3.25.3.5 Partial Backfill Alternative

Impacts to forestry products would be similar to those described for the Proposed Action; however, the Partial Backfill Alternative would involve the partial backfilling of the open pit to eliminate the pit lake and the floor of the open pit would be reclaimed using growth media and then seeded. Although the Proposed Action would have 734 acres that would remain unvegetated in the open pit, under this alternative approximately 527 acres would remain unvegetated following Project completion and reclamation; therefore, impacts to forestry products would be similar to, but slightly less than, those described for the Proposed Action.

- **Impact 3.25.3.5-1:** Disturbance or removal of 3,**296** acres of vegetation with a singleleaf piñon and Utah juniper component would occur as a result of the Proposed Action.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.25.3.5.1 Residual Adverse Impacts

Residual adverse effects to forestry products would include the permanent loss of vegetative productivity from approximately 527 acres of land associated with the open pit that would not be reclaimed and a long-term change in vegetation composition (i.e., tree and shrub dominated communities to grass and forb dominated communities) as a result of Project development and operation.

Residual impacts to woodland products would result from the long-term loss of approximately 3,**296** acres of vegetation communities with a singleleaf piñon and Utah juniper component on BLM-administered land. Woodland products from these areas would not be available until mature trees had become reestablished, which would take approximately 75 to 100 years. Of the 3,**296** acres of total disturbance in singleleaf piñon and Utah juniper, approximately 527 acres of singleleaf piñon and Utah juniper would be permanently lost with the development of the open pit.

3.25.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Although the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in approximately 20 acres less surface disturbance when compared to the Proposed Action, impacts to vegetation community types from this alternative would be similar to those for the Proposed Action since the disturbance acreage would decrease by only 0.2 percent.

- **Impact 3.25.3.6-1:** Disturbance or removal of 3,**296** acres of vegetation with a singleleaf piñon and Utah juniper component would occur as a result of the Proposed Action.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.25.3.6.1 Residual Adverse Impacts

The potential residual impacts to forestry products from the Off-Site Transfer of Ore Concentrate for Processing Alternative would be similar to those for the Proposed Action.

3.25.3.7 Slower, Longer Project Alternative

Impacts to forestry products from the Slower, Longer Project Alternative are expected to be similar to impacts from the Proposed Action at the end of the Project; however, impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action.

- **Impact 3.25.3.7-1:** Disturbance or removal of 3,**296** acres of vegetation with a singleleaf piñon and Utah juniper component would occur as a result of the Proposed Action.

  Significance of the Impact: The impact is not considered significant.

  No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.25.3.7.1 Residual Adverse Impacts

Residual adverse impacts to forestry products would include the permanent loss of vegetative productivity from approximately 734 acres of land associated with the open pit that would not be reclaimed and a long-term change in vegetation composition (i.e., tree and shrub dominated communities to grass and forb dominated communities) as a result of Project development and operation.

Residual adverse impacts to woodland products would result from the long-term loss of approximately 3,**296** acres of vegetation communities containing a singleleaf piñon and Utah juniper component on BLM administered land. Woodland products from these areas would not be available until mature trees had become reestablished, which would be longer compared to the Proposed Action because of in the increased duration of this alternative. Of the 3,**296** acres of total disturbance in vegetation with a singleleaf piñon and Utah juniper component, approximately 734 acres of singleleaf piñon and Utah juniper would be permanently lost with the development of the open pit.

3.26 Proposed Mitigation Measures Outside the BLM's Jurisdiction

As outlined in guidance from the CEQ (and echoed in the BLM NEPA Handbook) in an EIS, all "relevant, reasonable mitigation measures that could improve the project are to be identified, even if they are outside the jurisdiction of the lead agency or cooperating agencies, and thus would not be committed as part of the RODs of these agencies" (CEQ, Forty Most Asked Questions Concerning the CEQ's NEPA Regulations, March 23, 1981, Question 19b). The BLM acknowledges that it has no regulatory authority to require or implement mitigation outside of its jurisdiction. However, in an effort to inform and alert other agencies that can or may be able to implement the mitigation, the BLM has identified suggested mitigation measures that are outside of the BLM's jurisdiction but could be applied to reduce or eliminate the effects of the Proposed Action or the action alternatives. These potential mitigation measures are outlined in this section. In addition, the following text identifies the regulatory agency responsible for implementing this mitigation, if one exists, as well as some discussion on the probability of the mitigation being implemented.

3.26.1 Water Rights

Potential additional mitigation for impacts to water rights is similar to the water resource mitigation outlined in Sections 3.2 and 3.3 of the EIS which would require EML to mitigate impacts to water rights as a result of Project activities. This mitigation may include, but not be limited to, the following: changing and/or discontinuing the pumping regime; drilling a new water well for an impacted water right holder; or paying the affected water right

holder for the incremental increase in pumping costs for the impacted water right. This mitigation would be required by the NDWR, which has a regulatory process to implement the identified mitigation. If a water right is affected by the Project activities and the water right holder files for relief with the NDWR, historic adjudications by the NDWR have shown that there is a high likelihood that the NDWR would act; however, the seniority of the affected water right relative to the EML water rights would factor into a NDWR determination.

3.26.2 Transportation

Potential mitigation for transportation impacts would require EML to mitigate impacts to transportation as a result of Project activities. This mitigation may include, but not be limited to, the following: more frequent monitoring and maintenance of SR 278; the construction of passing lanes on SR 278 in Pine Valley and Diamond Valley; the construction of school bus turnouts; or more frequent snow removal and the application of traction aids during snow and ice conditions. This type of mitigation has been historically implemented and has successfully alleviated safety and congestion impacts. This mitigation would be required by the NDOT; however, the NDOT does not have a regulatory process that could require the implementation of the above identified mitigation. Thus, there appears to be a low likelihood that the above identified mitigation would be implemented.

3.26.3 Livestock Grazing and Production

Potential mitigation for livestock grazing and production impacts would require EML to mitigate impacts to grazing as a result of Project activities. This mitigation may include, but not be limited to, the following: requiring EML to enter into a contract with the permittees for the Roberts Mountain and Romano Grazing Allotment to compensate for the losses in available AUMs. There is no regulatory agency that could require the implementation of this mitigation. Historically, the probability of successfully implementing this type of mitigation is low.

3.26.4 Air Quality

Potential mitigation for impacts to air quality would require EML to mitigate impacts as a result of Project activities. This mitigation may include, but not be limited to, the following: installation and operation of continuous emission monitors on various Project process components; or the installation and operation of ambient air quality monitoring at one or more points outside the Project fence boundary. In addition, the following mitigation measures to reduce impacts associated with emissions of particulate matter, NO_2, ozone, and other toxic air pollutants from mining activities could be implemented:

- **Limit idling of heavy equipment to less than five minutes and verify through unscheduled inspections;**
- **Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, prevent tampering, and conduct unscheduled inspections;**
- **If practicable, lease new, clean equipment meeting the most stringent of applicable Federal standards. In general, commit to the best available emissions control**

technology. Tier 4 engines should be used for project construction equipment to the maximum extent feasible;

- **Lacking availability of non-road construction equipment that meets Tier 4 engine standards, EML should commit to using best available control technology to reduce emissions of diesel particulate matter and other pollutants at the mine site; and**
- **Consider alternative fuels such as natural gas and electricity (plug-in or battery).**

This mitigation would be required by the BAPC which has a regulatory process to implement the identified mitigation. If the BAPC determines that EML is operating the Project in a manner that violates the conditions of their Air Quality Operation Permit, then there is a high likelihood that the BAPC would act to address the situation. Additionally, the BAPC likely might also require other types of conditions or limitations on the operation to mitigate these impacts in order to ensure that EML operates within their air permit conditions.

3.26.5 Socioeconomics

Potential mitigation for social and economic impacts would require coordination and collaboration between EML and local governments to mitigate impacts as a result of Project activities to housing and provision of public infrastructure and services. This mitigation may include, but not be limited to, the following:

- **EML would develop a housing plan in close coordination with Eureka County and involve Elko County, Lander County, and White Pine County. This housing plan would document plans for housing both the construction and operation workforce in full. In each case, the plan would address the housing needs for daily commuters from outside southern Eureka County, single status weekly commuters to Eureka County, and relocating households to Eureka County. Actions outlined in the housing plan expand on and formalize the housing options laid out in Section 3.17.3.3.3 and would address the needs for both temporary and permanent housing. Any construction would be required to adhere to policies and controls of Eureka County or other counties if applicable. The plan would be updated annually to account for changes in housing demand that differ from the assumptions used in the EIS. Successful implementation of this mitigation would depend on good faith efforts from all parties.**

The State of Nevada, Eureka County, and other listed Nevada counties do not have a regulatory process that could require the implementation of the above identified mitigation. As of August 2012, collaborative social and economic planning efforts between EML and Eureka County remain suspended. Unless the parties resume discussions, there is a low likelihood that the above mitigation would be implemented.

3.27 Relationship Between Short-Term Uses and Long-Term Productivity of the Human Environment

Short term is defined as the life of the Project through closure and reclamation. Long term is defined as the future beyond reclamation. The short-term use of resources during the construction, operation, and reclamation of the mine would result in beneficial impacts in

the form of additional local employment and the generation of revenue. The proposed project would result in various short-term impacts such as the temporary loss of soil and vegetation productivity and the associated loss of herbaceous habitat, possible wildlife avoidance, a reduction in dispersed recreation opportunities, temporary increases in fugitive dust, social and economic impacts to the local infrastructure, and increased noise levels. These impacts are expected to end upon completion of operations and would be minimized through implementation of EMLs applicant committed practices and EIS mitigation measures. The short-term visual impacts would last a few years beyond mine closure and would gradually be reduced as vegetation becomes established. The scale and extent of the waste rock dumps and tailings impoundment facilities would continue to alter the local landscape and views in the long term. Impacts to long-term productivity (i.e., following Project reclamation) would primarily depend on the effectiveness of the proposed reclamation of the disturbed areas. Successful reclamation would provide for post-mining wildlife and livestock grazing by establishing self-sustaining plant communities. Revegetation is also expected to stabilize disturbed surfaces and control erosion. There would be long-term loss in soil and vegetation productivity and associated terrestrial wildlife habitat, a reduction in livestock grazing areas, and public lands used for dispersed recreation that would not be reclaimed. In addition, a potential long-term loss of riparian vegetation associated with seeps, springs, and creeks associated with mine dewatering pending recovery of the ground water tables.

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4 CUMULATIVE IMPACTS AND IRREVERSIBLE/ IRRETRIEVABLE COMMITMENT OF RESOURCES

4.1 Introduction

CEQ regulations for the NEPA define cumulative impact as follows:

> "...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

As required under the NEPA and the regulations implementing the NEPA, this chapter addresses those cumulative effects on the environmental resources in the CESAs, which could result from the implementation of the Proposed Action and reasonable alternatives, past actions, present actions, and reasonably foreseeable future actions (RFFAs). The extent of the CESA will vary with each resource, based on the geographical or biological limits of that resource. As a result, the list of projects considered under the cumulative analysis vary according to the resource being considered. In addition, the length of time for cumulative effects analysis will vary according to the duration of impacts from the Proposed Action on the particular resource.

For the purposes of this analysis and under federal regulations, 'impacts' and 'effects' are assumed to have the same meaning and are interchangeable. The cumulative impacts analysis was accomplished through the following three steps:

- Step 1: Identify, describe, and map CESAs for each resource to be evaluated in this chapter;

- Step 2: Define timeframes, scenarios, and acreage estimates for cumulative impact analysis. Past and present disturbances and activities include commercial/public and mining operations with disturbed areas not reclaimed or unsatisfactorily reclaimed (based on a pre-bonding timeframe) (impacts from those activities are reflected in the current condition). Future scenarios address reasonably foreseeable actions from the following: grazing and agriculture; utilities and infrastructure activities; wildfires, fuels management and reseeding activities; wild horse gathers; other wild horse management activities; habitat stabilization and rehabilitation activities; noxious weed and invasive, nonnative species control activities; recreation and wilderness activities; land development activities; mining and exploration operations identified in notices and plans of operation; hazardous/solid waste and hazardous materials activities; or oil and gas operations; and

- Step 3: Identify and quantify (if possible) the location of possible specific impacts from the Proposed Action and judge the significance of these contributions to the overall impacts. The incremental impact of the Proposed Action is determined by first calculating the sum of all the past, present, and RFFAs (excluding the Proposed Action) actions and then determining incremental increase from the Proposed Action (e.g., if all actions, excluding the Proposed Action, total 1,000 acres and the Proposed Action is ten acres, then the incremental contribution of the Proposed Action would be one percent).

Information utilized in the cumulative impacts assessment was gathered from the following sources: the BLM; State of Nevada; local jurisdictions; private land owners; and mining companies. The past actions, present actions, and RFFAs are current as of February 2011. Changes in actions after this date are not considered in this analysis.

Environmental consequences of the Proposed Action and the reasonable alternatives were evaluated in Chapter 3 for the various environmental resources. Based upon the analysis of the environmental resources as completed in Chapter 3, the following resources could be impacted by the Proposed Action and reasonable alternatives: water quality and quantity; geology and minerals; air quality; soils; vegetation; wildlife and fisheries; special status species; livestock grazing and production; land use authorizations; recreation and wilderness; visual resources; auditory resources; socioeconomics; hazardous materials; cultural resources; forest products; historic trails; Native American Traditional Values; noxious weeds, invasive, nonnative species; transportation and access; wetlands and riparian zones; migratory birds; and wild horses. The above resources are considered to have the potential to be cumulatively impacted by actions within the identified CESA for that resource.

4.2 Cumulative Effects Study Areas

The geographical areas considered for the analysis of cumulative effects are generally illustrated in Figures 4.2.1 and 4.2.2. The locations vary in size and shape to reflect each evaluated environmental resource. Table 4.2-1 outlines the CESAs and their size, as well as references to the figures that show the area.

The CESA for surface water and ground water quality and quantity was determined to be the three hydrographic subbasins, based on the location of the Project relative to the location and patterns of subsurface waters and aquifers.

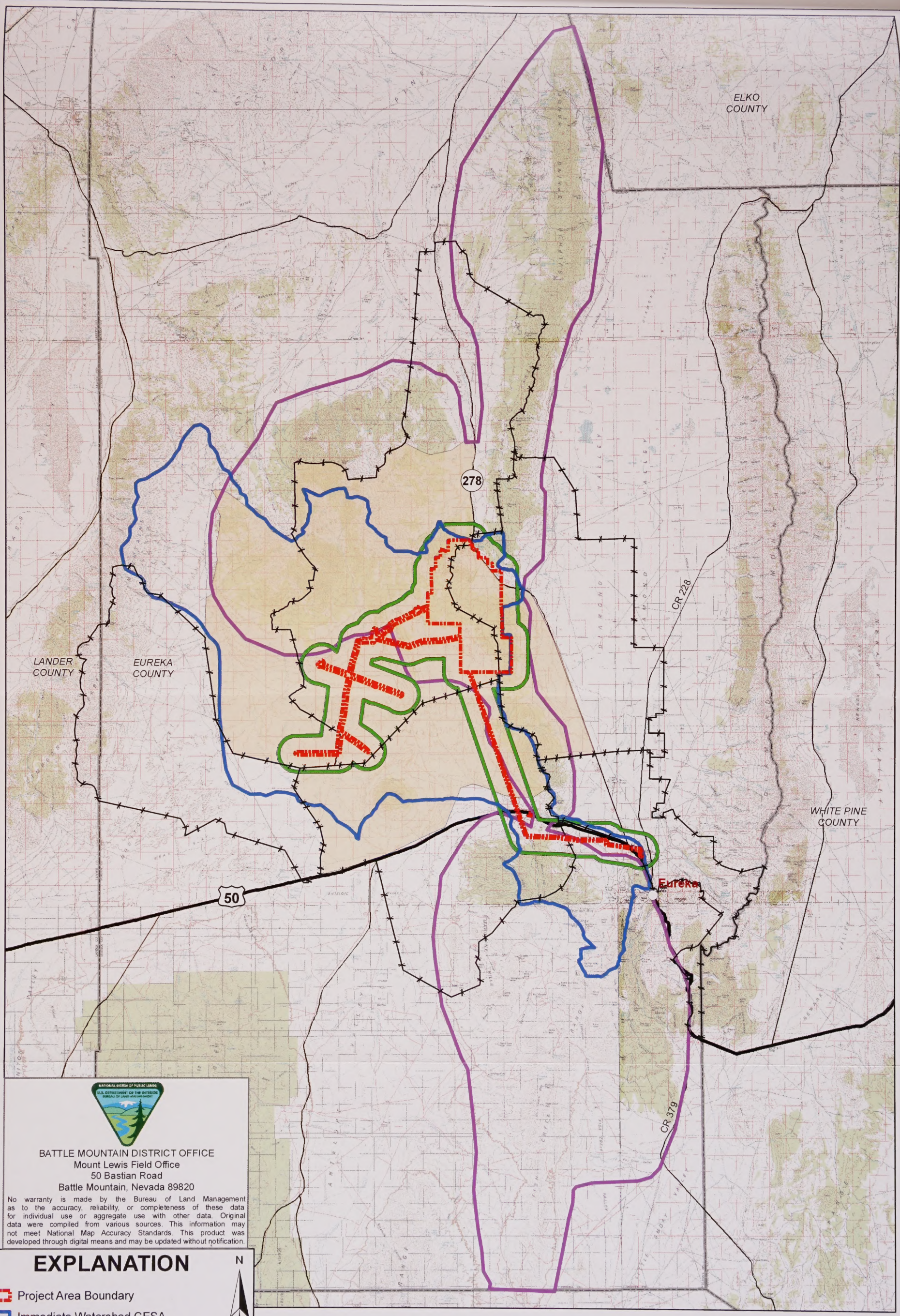
The CESA for geology and minerals was determined to be an area 30 miles in radius from the Project's open pit, based on a determination that the area adequately encompassed the resource use in the east central portion of Nevada.

The CESA for air quality was determined to be the three air basins within which the Project is located, based on the anticipated extent of air impacts. The regulatory framework for air resources in the State of Nevada is based on air basins.

The CESA for soils, vegetation (including special status plant species and fire management), noxious weeds, invasive nonnative species, and wetlands and riparian zones was determined to be the local watershed, based on an assessment that each of these resources would have similar impact characteristics within the local watershed for the Project Area.

The CESA for wildlife and fisheries (including special status animal species and migratory birds) was determined to be the four hunt units, since **the majority of the** effects from the Project would **occur** to wildlife **habitat within** the four hunt units.

The CESA for livestock grazing and production was determined to be the grazing allotments that the Project is located within, as well as the allotments in the ten-foot drawdown contour associated with the ground water impacts (Section 3.2.3), based on the fact that the allotments define the range resource.



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EXPLANATION

- Project Area Boundary
- Immediate Watershed CESA
- Land Use and Access CESA
- Livestock Grazing and Production CESA
- Wild Horse CESA
- Forestry CESA

N

0 1 2 4 6 8 10 Miles

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CHECKED: -	APPROVED: RFD	DATE: 08/06/2012	
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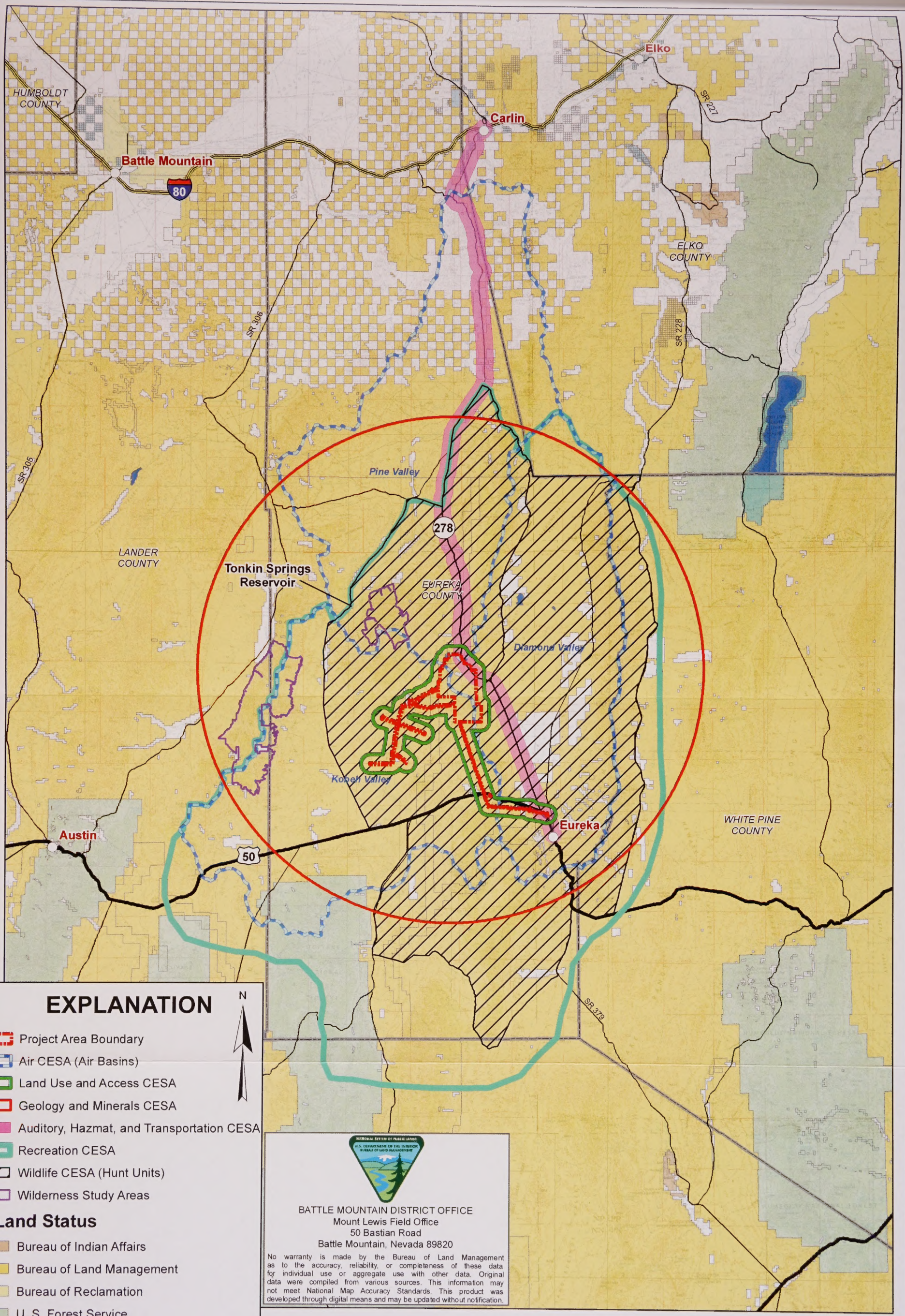
BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Large Scale Cumulative Effects Study Areas Map

Figure 4.2.1



EXPLANATION

- Project Area Boundary
- Air CESA (Air Basins)
- Land Use and Access CESA
- Geology and Minerals CESA
- Auditory, Hazmat, and Transportation CESA
- Recreation CESA
- Wildlife CESA (Hunt Units)
- Wilderness Study Areas

Land Status

- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- U. S. Forest Service
- U. S. Fish and Wildlife Service
- State of Nevada
- Private
- Water

N

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BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Small Scale Cumulative Effects Study Areas Map

Figure 4.2.2

The CESA for land use was determined to be the area within a one-mile buffer around the Project, based on an assessment that any effect of the Project to land use authorization and access would not extend beyond a one-mile buffer of the Project Area.

Table 4.2-1: Cumulative Effects Study Areas by Resource

Resource	Cumulative Effects Study Area	Size of Area (acres)	Figure Number Reference
Ground Water Quality and Quantity	Hydrographic Subbasins 53, 139, 153	1,671,181	4.2.2 4.4.1
Surface Water Quality and Quantity	Hydrographic Subbasins 53, 139, 153	1,671,181	4.2.2 4.4.1
Geology and Minerals	Thirty-mile radius around the open pit	1,809,552	4.2.2 4.3.5
Air Quality	Hydrographic Subbasins 53, 139, 153	1,671,181	4.2.2
Soils	Immediate Watershed	262,490	4.2.1
Vegetation (including Special Status Species and Fire Management)	Immediate Watershed	262,490	4.2.1
Wildlife and Fisheries (including Special Status Species)	NDOW Hunt Units 142, 143, 144, and 145	1,250,319	4.2.2
Livestock Grazing and Production	Grazing Allotments	**544,458**	4.2.1
Land Use	One mile buffer around the Project Area	75,901	4.2.1
Recreation and Wilderness	An area generally bounded by the Simpson Park Range, Pine Valley, Newark Valley and approximately 30 miles south of the Town of Eureka	1,970,179	4.2.2
Visual Resources	Viewshed of the Project as represented by the KOPs	Approx. 645,000	3.7.1
Auditory Resources	One mile buffer around the Project Area, the SR 278 transportation corridor (including the City of Carlin), and U.S. Highway 50 from SR 278 through the Town of Eureka	97,720	4.2.1
Socioeconomics	**The CESA for socioeconomics and environmental justice was determined to include those projects and activities regardless of location, that have a potential effect on socioeconomics or environmental justice as analyzed in this EIS.**	**n/a**	**n/a**
Hazardous Materials	One-mile buffer around the Project Area, the SR 278 transportation corridor (including the City of Carlin), and U.S. Highway 50 from SR 278 through the Town of Eureka	97,720	4.2.2
Cultural Resources	Project Area, and the viewshed of the Project from specific historic cultural properties within 20 miles of the Project	200,960	3.7.1
Historic Trails	Viewshed of the Project from the Pony Express Trail	69,061	3.20.1
Native American Traditional Values	North Central Nevada from Kobeh Valley to the Tuscarora Mountains, and from the Shoshone Range to the Piñon Range	3,218,045	4.4.2 4.3.3

Resource	Cumulative Effects Study Area	Size of Area (acres)	Figure Number Reference
Environmental Justice	Southern Eureka County	1,692,208	3.17.1
Noxious Weeds, Invasive and Nonnative Species	Immediate Watershed	262,490	4.2.1
Wetlands and Riparian Zones	Immediate Watershed	262,490	4.2.1
Wild Horses	Roberts Mountain, Whistler Mountain, and Fish Creek (north of U.S. Highway 50) HMAs and historic use areas.	253,610	4.2.1
Transportation and Access	One-mile buffer around the Project Area, the SR 278 transportation corridor (including the City of Carlin), and U.S. Highway 50 from SR 278 through the Town of Eureka	97,720	4.2.2
Forest Products	The Sulphur Springs Ranges, the Roberts Mountains, the Whistler Mountains, and the Fish Creek Range within Eureka County.	515,000	4.2.1

The CESA for recreation and wilderness is based on the anticipated Project-related increase in population and demands on recreation and wilderness resources from the expected population increase as opposed to potential specific effects associated with the mining activities. For this reason, the CESA has been defined by topography and the inclusion of areas typically utilized by the residents of Eureka and Diamond Valley. The recreation and wilderness CESA includes the area east of the Simpson Park crest, south of the JD Ranch Road/northern end of Diamond Valley Playa, west of the middle or eastern edge of Newark Valley, and north of a boundary located approximately 30 miles south of Eureka (an area that would include the Fish Creek Range, Mahogany Hills, Ninemile Peak portion of the Antelope Range, and the northern portion of the Monitor Range).

The CESA for visual resources was determined to be the viewshed of the Project as represented by the KOPs, based on the fact that it is the area where the Project effects could be viewed relative to cumulative activities. The viewshed contains approximately 645,000 acres.

The CESA for auditory, hazardous materials, and transportation and access was determined to be the area within a one-mile radius around the Project, the SR 278 transportation route (including the City of Carlin, and U.S. Highway 50 from SR 278 through the Town of Eureka), based on the assessment that any effect to the Project from hazardous materials would not extend beyond a one-mile buffer of the Project Area or on SR 278 and U.S. Highway 50.

The CESA for socioeconomics and environmental justice was determined to **include those projects and activities regardless of location, that have a potential effect on socioeconomics or environmental justice as analyzed in this EIS**.

The CESA for cultural resources was determined to be the Project Area and the viewshed of the Project from selected historic cultural properties, based on the fact that the Project could only directly affect cultural resources within the Project Area, and any indirect effects would only be visual from those specific historic cultural properties where the Project's effects could be viewed relative to cumulative activities.

The CESA for historic trails was determined to be the viewshed of the Project from the Pony Express Trail, based on the fact that it is the area where Project effects could be viewed relative to cumulative activities.

The CESA for Native American Traditional Values was determined to be the area of north central Nevada, which encompasses Kobeh Valley on the south, the Tuscarora Mountains on the north, the Shoshone Range on the west, and the Piñon Range on the east, based on information obtained through Native American consultation for the Proposed Action, the Cortez Hills Expansion Project, and other actions in the Mount Lewis and Tuscarora Field Offices.

The CESA for wild horses was determined to be the HMAs that the Project is located within, as well as the adjacent historic use areas.

The CESA for forest products was determined to be the area that encompasses the Sulphur Springs Range, the Roberts Mountains, the Whistler Mountains, and the Fish Creek Range within Eureka County.

The cumulative impacts analysis for this EIS utilizes a time frame based on the estimated potential future duration of the impacts from the Proposed Action. Based on a Project approval in 2011 and a 32-year mining life and a 44-year milling operations life, the time frames over which the cumulative analysis was completed are as follows:

- Geology and minerals and cultural resources - length of the mining portion of the Project; approximately 32 years (through 2043);
- Water resources and wetlands and riparian zones - time frame for the maximum extent of drawdown, which would occur after processing is completed is greater than 200 years in the future (beyond 2200); and
- Air quality, visual resources, soils, vegetation resources, noxious weeds, invasive and nonnative species, livestock grazing and production, wild horses, recreation and wilderness, auditory resources, social and economic values, wildlife and fisheries, hazardous materials, transportation and access, historic trails, Native American Traditional Values, environmental justice, forest products, and land use - length of the Project, including reclamation; approximately 74 years (through 2085).

The types of Project-specific impacts to the resources evaluated in Chapter 3 may also occur as a result of the past actions, other present actions, and RFFAs. The potential cumulative effects from the past actions, present actions, and RFFAs are discussed in Section 4.4. The individual projects described in Section 4.3 comprise the past and present actions, and RFFAs identified by the BLM's MLFO, Tuscarora, and Egan Field Offices.

The projects and activities include the following: grazing and agriculture; utilities and distribution; wildfires and reseeding; fuels management projects; stabilization and rehabilitation activities; noxious weed and invasive, nonnative species control activities; recreation; land development; mineral development and exploration; **wild horse and burro management; range/habitat improvement projects;** and oil, gas, and geothermal leasing. All of the projects

and activities have the potential to impact the environmental resources of concern within all or portions of the various CESAs.

Table 4.2-2 outlines all the actions considered in the cumulative impacts analysis, their status, potential environmental impacts, and the area of the potential impact. An explanation of the abbreviations and numbering is located at the end of the table. In addition to the actions outlined in Table 4.2-2, there are a number of activities or management actions that have or would affect vegetation or vegetation health, which have occurred in the past, are occurring now, and will continue to occur in the future. These include timber removal for historic mining activities, livestock use and management, wildlife use, and wild horse use and management. The BLM is also in the process of revising their RMP for the BMDO, which includes the Project and surrounding areas. The BLM is currently in the early stages of the RMP development and no specific activities or alternatives have been developed. The development of the revised RMP may result in changes to management decisions and directions on public lands.

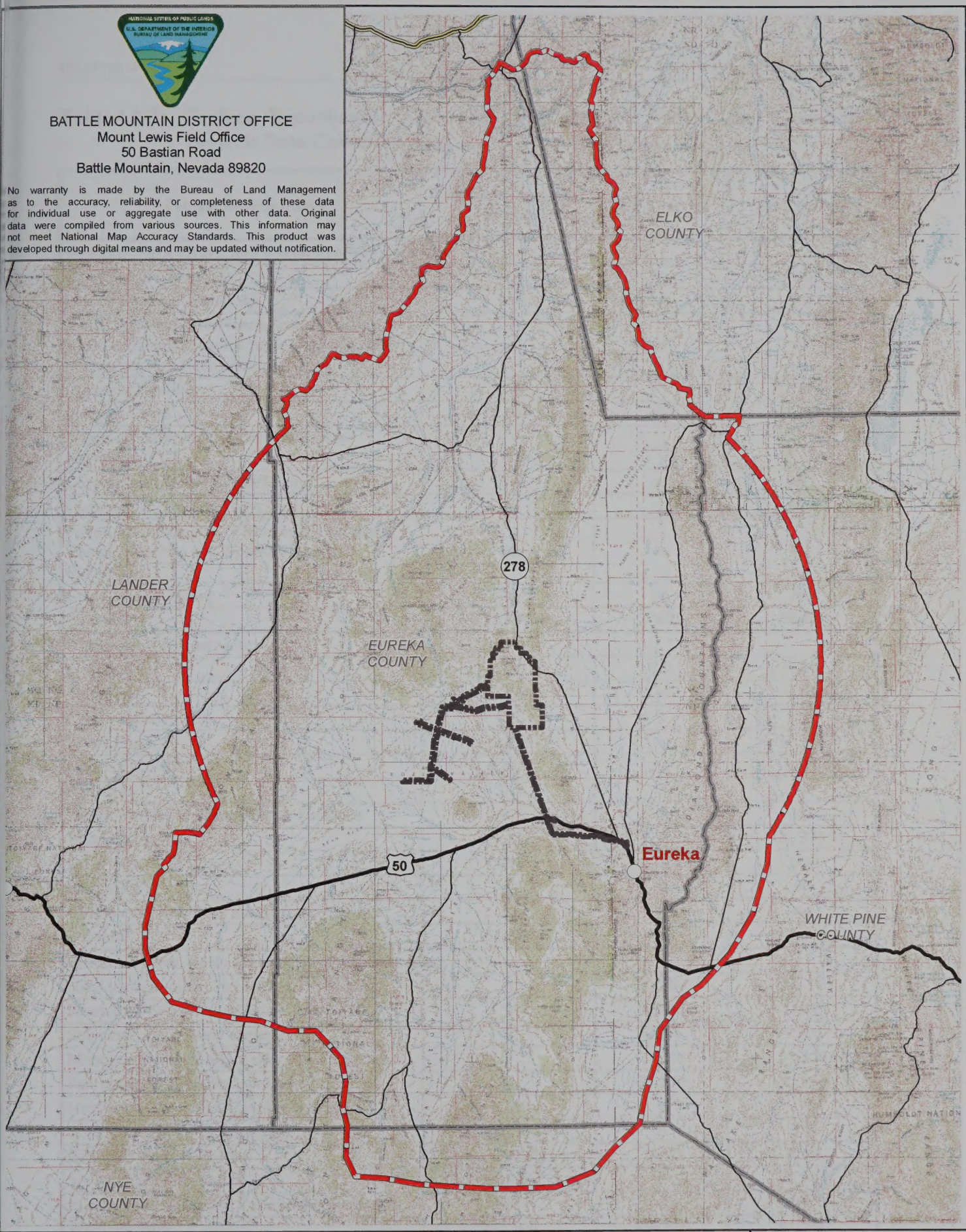
Table 4.2-2: Summary of Activities that May Cumulatively Affect Resources

Project Descriptions	Status	Anticipated Resources That Could Be Cumulatively Impacted	Primary/ Secondary Impact Location
Grazing, Agriculture, and Forest Product Activities			
Open Range Operations	PP, RF	1, 4, 5, 6, 7, 8, 13, 15, 20, 21, 23	AW, WL
Fenced Feeding Operations	PP, RF	1, 4, 5, 6, 7, 8, 13, 15, 20, 21,23	AW, WL
Range Improvements (fences, cattle guards, wells, windmills, pipeline/trough, springs, water pumps, noxious weed control)	PP, RF	1, 4, 5, 6, 7, 8, 13, 15, 20, 21	AW, WL
Irrigated Crops	PP, RF	1, 4, 6, 7, 8, 13, 15, 20, 21,23	AW, WL
Personal Fire Wood and Christmas Tree Harvesting	PP, RF	3, 4, 5, 6, 12, 13, 17, 20, 21,23	NA, WL
Commercial Fire Wood Harvesting	PP, RF	3, 4, 5, 6, 12, 13, 17, 20, 21,23	NA, WL
Commercial Pine Nut Harvesting	PP, RF	3, 4, 5, 6, 12, 13, 17, 20, 21,23	NA, WL
Public (including Native American) Pine Nut and Woodland Products Harvesting	PP, RF	3, 4, 5, 6, 12, 13, 15, 20, 21,23	NA, WL
Greenwood Cutting	PP, RF	3, 4, 5, 6, 12, 13, 17, 20, 21,23	NA, WL
Utilities and Infrastructure			
Powerlines	PP, RF	1, 4, 5, 6, 7, 8, 9, 11, 15, 16, 20, 21, 23	AW
Telephone	PP, RF	1, 4, 5, 6, 7, 8, 9, 11, 15, 16, 20, 21, 23	AW
Communication Sites	PP,RF	1, 4, 5, 6, 7, 8, 9, 11, 15, 16, 20, 21, 23	AW
Paved Roads	PP, RF	1, 3, 4, 5, 6, 7, 8, 9, 11, 15, 16, 20, 21, 23	AW
Unpaved Roads	PP, RF	1, 3, 4, 5, 6, 7, 8, 9, 11, 15, 16, 20, 21, 23	AW
Railroads	PP, RF	1, 3, 4, 5, 6, 7, 8, 9, 11, 15, 16, 20, 21, 23	AW
Public Water **and Waste Water** Facilities	PP	1, 7, 13, 23	AW
Wind Generation	RF	1, 4, 5, 6, 7, 8, 9, 10, 11, 13, 15, 20, 21, 23	WL
Other Federal Facilities	PP, RF	1, 4, 5, 6, 7, 8, 9, 11, 15, 16, 20, 21, 23	AW
Reservoirs	PP	1, 6, 7, 8, 10, 21, 23	RC, WL
Community Facilities and Infrastructure	**PP, RF**	**1, 3, 4, 5, 6, 9, 14, 20**	**WL**
Wildland Fires, Fuels Management, and Reseeding			
Henderson-Romano Project Fuels Treatment	RF	1, 3, 4, 5, 6, 7, 8, 10, 11, 15, 20, 21, 23	WL, AW

Project Descriptions	Status	Anticipated Resources That Could Be Cumulatively Impacted	Primary/ Secondary Impact Location
Henderson Creek Project Fuels Treatment	RF	1, 3, 4, 5, 6, 7, 8, 10, 11, 15, 20, 21, 23	WL, AW
Sulphur Springs Fuels Treatment	RF	1, 3, 4, 5, 6, 7, 8, 10, 11, 15, 20, 21, 23	WL, AW
Mahogany Hills-Spring Valley Fuels Treatment	RF	1, 3, 4, 5, 6, 7, 8, 10, 11, 15, 20, 21, 23	WL, AW
Fenstermaker Wash Project Fuels Treatment	RF	1, 3, 4, 5, 6, 7, 8, 10, 11, 15, 20, 21, 23	WL, AW
Northwest Diamond Valley Fuels Reduction	PP	1, 3, 4, 5, 6, 7, 8, 10, 11, 20, 21, 23	WL, AW
Tonkin Project Fuels Treatment	PP	1, 3, 4, 5, 6, 7, 8, 10, 11, 20, 21, 23	WL, AW
Red Hills Fuels Reduction	PP	1, 3, 4, 5, 6, 7, 8, 10, 11, 20, 21, 23	WL, AW
Seven Mile Fuels Reduction	PP	1, 3, 4, 5, 6, 7, 8, 10, 11, 20, 21, 23	WL, AW
Eureka-South Diamond Valley Fuels Reduction	PP	1, 3, 4, 5, 6, 7, 8, 10, 11, 20, 21, 23	WL, AW
Wildland Fires	PP, RF	1, 3, 4, 5, 6, 7, 8, 10, 11, 20, 21, 23	WL, AW
Habitat Stabilization, Rehabilitation, and Wild Horse Management Activities			
3-Bars Ecosystem and Landscape Restoration Project	RF	1, 5, 6, 7, 8, 21	AW, WL
Trout Creek Restoration	PP	1, 5, 6, 7, 8, 21	WL
Pine Creek Restoration	PP	1, 5, 6, 7, 8, 21	WL
Willow Creek Canyon	PP	1, 5, 6, 7, 8, 21	WL
Noxious Weed Control Activities	PP, RF	5, 6, 7, 20	WL, IM
Roberts Mountain Allotment Exclosure	PP	1, 5, 6, 7, 8, 21	WL
3-Bars East Range Exclosures	PP	1, 5, 6, 7, 8, 21	WL
Roberts Mountain WSA Road Rehabilitation	PP	5, 6, 7, 8, 10, 20, 21	WL
Allotment Management for Habitat	PP, RF	5, 6, 7, 8, 21	WL, IW
Wild Horse Management	PP, RF	1, 5, 6, 7, 8, 15, 21, 23	AW, IW
Federal Water Facilities	PP, RF	1, 5, 6, 7, 8, 15, 21, 23	AW, IW
Recreation and Wilderness			
Annual Pony Express Trail Re-Rides	PP, RF	6, 10	RC
Yearly Permits for Commercial Outfitters and Guides	PP, RF	6, 10, 13	RC
Land Speed Record Attempt on Diamond Valley Playa	RF	6, 10	RC
Dispersed Recreation	PP, RF	6, 10, 15	RC
Recreation Use Areas (Roberts Mountain WSA, Simpson Park WSA, Tonkin Springs, Roberts Mountains, Antelope Range, Simpson Park Range)	PP, RF	6, 10	RC
Hickison Petroglyph Recreation Site	PP, RF	6, 10, 15	RC
Land Development			
Eureka	PP, RF	1, 3, 4, 5, 6, 7, 9, 13, 19	AW, WL
Diamond Valley	PP, RF	1, 3, 4, 5, 6, 7, 9, 13, 19	AW, WL
Kobeh Valley	RF	1, 3, 4, 5, 6, 7, 9, 13, 19	AW, WL
Pine Valley	RF	1, 3, 4, 5, 6, 7, 9, 13, 19	AW, WL
Land Sales	PP, RF	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21	WL, AW
Mineral Development and Exploration			
Mining and Exploration Plans of Operations (30)	PP, RF	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 28, 19, 20, 21	AW

Project Descriptions	Status	Anticipated Resources That Could Be Cumulatively Impacted	Primary/ Secondary Impact Location
Exploration Notices (164)	PP, RF	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 28, 19, 20, 21	AW
Sand and Gravel Extraction Operations (35)	PP, RF	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 28, 19, 20, 21	AW
Historic Eureka Mining District	PP	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 28, 19, 20, 21	AW
Hazardous/Solid Waste and Hazardous Materials			
Mine Hazardous/Solid Waste	PP	14	PT
Mine Hazardous Materials	PP	14	PT
Landfills	PP, RF	6, 9, 15, 21	AW, WL
Oil, Gas, and Geothermal Leasing			
Oil and Gas Leases (583)	PP	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 28, 19, 20, 21	AW, MG
Oil and Gas Development (five)	PP, RF	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 28, 19, 20, 21	AW, MG
See key on next page.			
Source of Information: BLM-BM: BLM BMDO BLM-EK: BLM Elko Office BLM-EL: BLM Ely Office EML: Eureka Moly LLC NDOW: Nevada Department of Wildlife NDEP: Nevada Division of Environmental Protection NDOT: Nevada Department of Transportation	Status: PP-Past and Present Actions RF-Reasonably Foreseeable	Issues: 1-Water Resources 2-Geology and Minerals 3-Air Quality 4-Soils 5-Vegetation 6-Wildlife and Fisheries 7-Wetlands and Riparian Zones 8-Livestock Grazing and Production 9-Land Use 10-Recreation and Wilderness 11-Visual Resources 12-Auditory Resources 13-Social and Economic Values 14-Hazardous Materials 15-Cultural Resources 16-Historic Trails 17-Native American Traditional Values 18-Paleontology 19-Environmental Justice 20-Noxious Weeds, Invasive and Nonnative Species 21-Wild Horses 22-Transportation and Access 23-Forest Products	Location: AW-Air and Water Basins GA-Grazing Allotments HA-Herd Area IW-Immediate Watershed LU-Land Use and Access MG-Minerals and Geology NA-Native American PA-Project Area PT-Project Area and Transportation RC-Recreation SE-Social and Economic WL-Wildlife and Special Status Species

Figure 4.2.3 illustrates the cumulative projects data collection area. Table 4.2-3 outlines the acres of surface disturbance associated with each of the actions considered in the cumulative impact area of analysis illustrated in Figure 4.2.3. The acreage values in Table 4.2-3 are totals under each category. Project-specific acres within each resource CESA are discussed under that resource. Table 4.2-4 outlines the activities and disturbance associated with the Native American Traditional Concerns CESA.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ELKO COUNTY
LANDER COUNTY
EUREKA COUNTY
278
50
Eureka
WHITE PINE COUNTY
NYE COUNTY
EXPLANATION
Project Area Boundary
Cumulative Projects Data Collection Area
N
0 5 10 15 Miles
DESIGN: EMLLC
DRAWN: CVD/GSL
REVIEWED: RFD
CHECKED: -
APPROVED: RFD
DATE: 08/01/2012
FILE NAME: p1635_Fig4-2-3_CumulativeCESAs_8i11i.mxd
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MOUNT HOPE PROJECT
DRAWING TITLE:
Cumulative Projects Data Collection Area (except Native American and Socioeconomics)
Figure 4.2.3

Table 4.2-3: Surface Disturbance[1] Associated with Projects within the Cumulative Projects Data Collection Area

Project Descriptions	Past and Present (acres)	RFFA (acres)	Total (acres)
Grazing, Agriculture, and Forest Product Activities			
Open Range Operations	nq	nq	nq
Fenced Feeding Operations	nq	nq	nq
Range Improvements (fences, cattle guards, wells, windmills, pipeline/trough, springs, water pumps, noxious weed control)	nq	nq	nq
Irrigation Facilities	156	0	156
Irrigated Crops	28,580	760	29,340
Personal Fire Wood and Christmas Tree Harvesting	nq	nq	nq
Commercial Fire Wood Harvesting	nq	nq	nq
Commercial Pine Nut Harvesting	nq	nq	nq
Public (including Native American Traditional Values) Pine Nut and Woodland Product Harvesting	nq	nq	Nq
Green Wood Cutting	nq	nq	Nq
Subtotal	**28,736**	**760**	**29,496**
Utilities and Infrastructure			
Powerlines	9,115	413	9,528
Telephone	4,930	34	4,964
Communication Site	231	1	232
Paved Roads	12,315	nq	12,315
Unpaved Roads	1,818	nq	1,818
Railroads	380	0	380
Public Water **and Waste Water** Facilities	489	0	489
Wind Generation	21,233	0	21,233
Other Federal Facilities	804	0	804
Reservoirs	60	0	60
Community Facilities and Infrastructure	**nq**	**0**	**nq**
Subtotal	**51,375**	**448**	**51,823**
Wildland Fires, Fuels Management, and Reseeding			
Henderson-Romano Project Fuels Treatment	0	23,200	23,200
Henderson Creek Project Fuels Treatment	0	1,000	1,000
Sulphur Springs Fuels Treatment	0	4,200	4,200
Mahogany Hills-Spring Valley Fuels Treatment	0	21,500	21,500
Fenstermaker Wash Project Fuels Treatment	0	35,500	35,500
Northwest Diamond Valley Fuels Reduction	1,349	0	1,349
Tonkin Project Fuels Treatment	350	0	350
Red Hills Fuels Reduction	1,000	500	1,500
Seven Mile Fuels Reduction	40,984	0	40,984
Eureka-South Diamond Valley Fuels Reduction	2,087	0	2,087
Wildland Fires	247,500	**436,600**	247,500

Project Descriptions	Past and Present (acres)	RFFA (acres)	Total (acres)
Subtotal	**283,270**	**522,500**	**805,770**
Habitat Stabilization, Rehabilitation, and Wild Horse Management Activities			
3-Bars Ecosystem and Landscape Restoration Project[2]	nq	**nq**	**nq**
Trout Creek Restoration	nq	**nq**	**nq**
Pine Creek Restoration	nq	**nq**	**nq**
Willow Creek Canyon	2,000	0	2,000
Noxious Weed Control Activities	306	**nq**	**306**
Roberts Mountain Allotment Exclosure	48	0	48
3-Bars East Range Exclosure	nq	0	0
Roberts Mountain WSA Road Rehabilitation	5	0	5
Allotment Management for Habitat	867	44,094	44,961
Federal Water Facilities	22	0	22
Subtotal	**3,248**	**44,094**	**47,342**
Recreation and Wilderness			
Annual Pony Express Trail Re-Rides	nq	**nq**	**nq**
Yearly Permits for Commercial Outfitters and Guides	nq	**nq**	**nq**
Land Speed Record Attempt on Diamond Valley Playa	nq	**nq**	**nq**
Dispersed Recreation	nq	**nq**	**nq**
Recreation Use Areas (Roberts Mountain WSA, Simpson Park WSA, Tonkin Springs, Roberts Mountains, Antelope Range, Simpson Park Range)	nq	**nq**	**nq**
Hickison Petroglyph Recreation Site	5	0	5
Subtotal	**5**	**0**	**5**
Land Development			
Eureka	880	0	880
Diamond Valley	700	0	700
Kobeh Valley	0	280	280
Pine Valley	0	480	480
Land Sales	0	5,000	5,000
Other	8,637	97	8,734
Subtotal	**10,217**	**5,857**	**16,074**
Mineral Development and Exploration			
Mining and Exploration Plans of Operations (27)	**12,758**	**10,143**	**22,901**
Exploration Notices (163)	368	24	392
Sand and Gravel Extraction Operations (41)	**1,759**	0	**1,759**
Historic Eureka Mining District (estimated)	200	0	200
Subtotal	**15,085**	**10,167**	**24,442**
Hazardous/Solid Waste and Hazardous Materials			
Mine Hazardous/Solid Waste	0	0	0
Mine Hazardous Materials	0	0	0
Landfills	40	80	120

Project Descriptions	Past and Present (acres)	RFFA (acres)	Total (acres)
Subtotal	**40**	**80**	**120**
Oil, Gas, and Geothermal Leasing			
Oil and Gas Leases (583)	0	573	573
Oil and Gas Development (five)	287	0	283
Subtotal	**287**	**573**	**856**
Total	**392,263**	**584,479**	**975,928**

nq - not quantified.
1 – Surface disturbance includes the actual disturbance of the ground or the removal of vegetation.
2 – This project encompasses an area that is approximately 750,000 acres. Currently an EIS is being prepared for the project. At this time no activities have officially been determined.

Table 4.2-4: Past, Present, and Reasonably Foreseeable Future Actions for the Native American Traditional Concerns Cumulative Effects Study Area[1]

Action	Past and Present Approved Disturbance (acres)	RFFA Projected Disturbance (acres)	Total Approved/ Projected Disturbance (acres)	Dewatering / Ground Water Consumption		Located in Piñon-Juniper or Piñon Communities[2]	
				Yes	No	Yes	No
Atlas Gold Bar	1,320	0	1,320		X	X	
Black Rock Canyon Mine	117	0	117		X		X
Bootstrap Project	1,505	0	1,505		X		X
Buckhorn Mine	820	0	820		X	X	
Carlin Mine	1,385	0	1,385		X		X
Clipper Mine	400	0	400		X		X
Cortez Mine	1,662	0	1,662		X		X
Gold Acres	881	50	931		X		X
Hilltop Mine	92	0	92		X		X
Horse Canyon	698	0	698		X	X	
Pipeline Project	7,616	0	7,616	X			X
Cortez Hills	6,792	0	6,792	X		X	
Robertson Mine	285	0	285		X		X
Cortez Silver Mining District	92	0	92		X	X	
EML Mount Hope	8,355	0	8,355	X		X	
Elder Creek Mine	143	0	143		X		
South Operations Area Project	5,750	0	5,750	X			X
Goldstrike/Betze Project	4,379	0	4,379	X			X
Greystone Mine	242	0	242		X	X	
Ivanhoe Project/Hollister Project	342	0	342	X			X
Leeville Project	486	0	486	X			X
Meikle Mine	92	0	92	X			X
Arturo/Storm Project	124	8,148	8272	X			X
Mule Canyon Mine	2,931	0	2,931	X			X

Action	Past and Present Approved Disturbance (acres)	RFFA Projected Disturbance (acres)	Total Approved/ Projected Disturbance (acres)	Dewatering / Ground Water Consumption		Located in Piñon-Juniper or Piñon Communities[2]	
				Yes	No	Yes	No
Rain/Emigrant Project	383	0	383	X			X
Subtotal	**38,092**	**8,198**	**40,968**	--	--	--	--
BLM Fuels Reduction Projects[3]	5,641	0	5,641		X	X	X
Wildland Fires[4]	622,311	0	622,311		X	X	X
Agriculture Development[5]	9,750	0	9,750	X			X
Carlin Water Supply	2	0	2	X			X
Eureka Water Supply	2	0	2	X			X
Crescent Valley Water Supply	2	0	2	X			X
Subtotal	**637,708**	**0**	**637,708**	--	--	--	--
Total	**683,315**	**8,198**	**692,145**	--	--	--	--

1 This table is based on data and information taken directly from the Cortez Hills Expansion Project FEIS (BLM 2008b) and modified to include the Cortez Hills Expansion Project and the Mount Hope Project.

2 P-J and P Communities are Piñon-Juniper and Piñon Vegetation Communities, as defined in the GAP data set.

3 Inclusive of acreage associated with the Crescent Valley Wildland Urban Interface Fire Defense System, Tonkin Hazardous Fuels Reduction Project, and Red Hills Hazardous Fuels Reduction Project. Of the total acreage, planned prescribed burns would affect up to 2,537 acres of piñon-juniper woodland, and 800 acres of piñon-juniper would be thinned.

4 Reflects acreage of vegetation affected by wildland fires from 1998 through 2006. The acreage is inclusive of approximately 27,804 acres of fire affected piñon-juniper woodland.

5 Surface disturbance associated with agricultural development is based on the acreage under irrigation and assumes that a change in vegetation and habitat equates to surface disturbance. Acreage values were based on a February 15, 1998, special hydrographic abstract for Hydrographic Basin No. 054 from the NDWR. These values are based on permitted or authorized use of water and may not reflect actual use in a given year. Potential agricultural development outside of Crescent Valley has not been quantified.

Source: BLM 2008b.

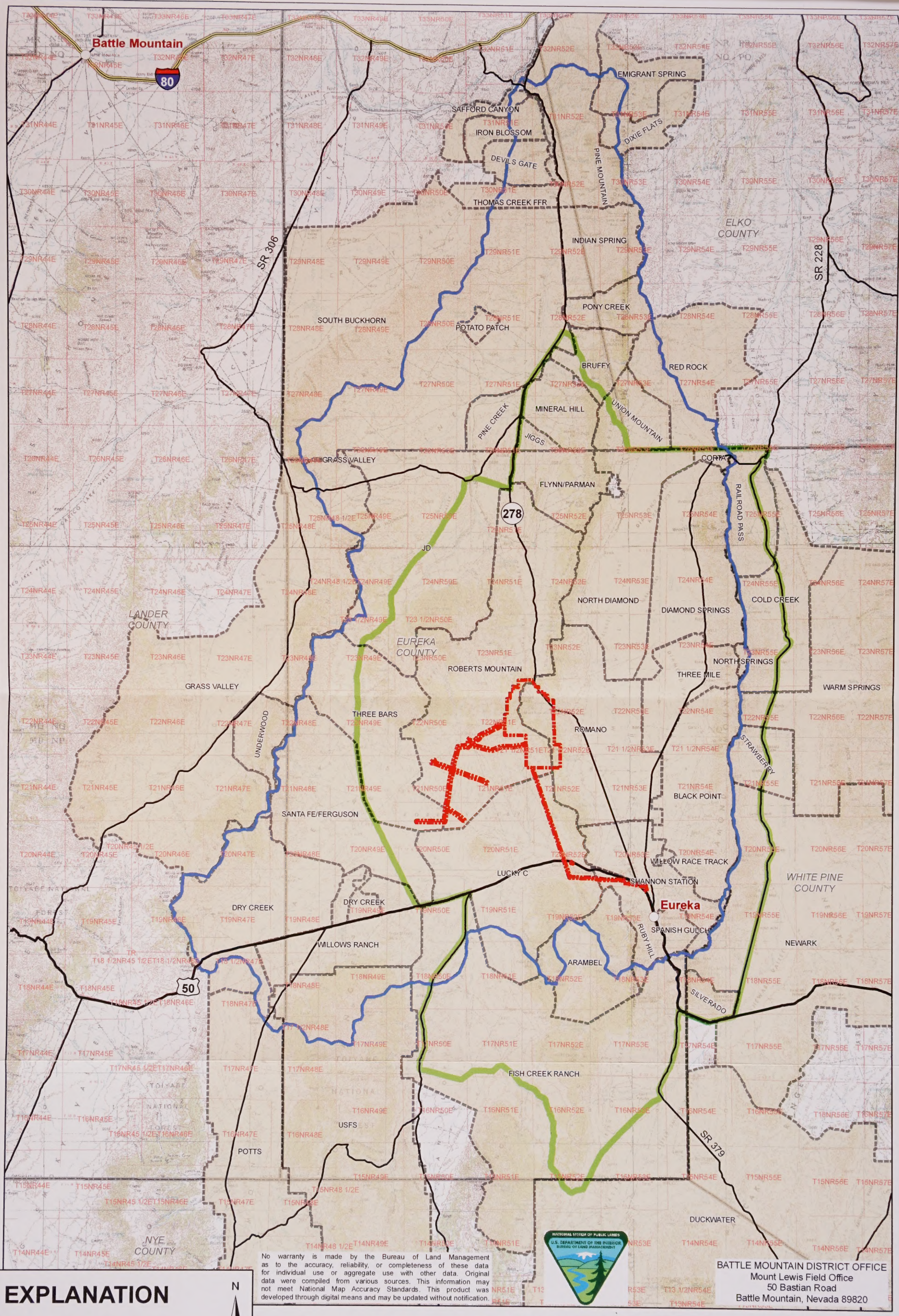
4.3 Past, Present, and Reasonably Foreseeable Future Actions

4.3.1 Grazing, Agriculture, and Forest Products

4.3.1.1 Past and Present Actions

Livestock grazing has been and continues to be a dominant land use in Eureka County and the adjoining portions of Elko, Lander, White Pine, and Nye Counties. Multiple grazing allotments have been permitted and administered by the BLM over approximately the past half century. Portions of 49 grazing allotments or federal fenced ranges exist within the area of all the CESAs (Figure 4.3.1). The carrying capacity, which is assumed to be the long-term use by livestock, wild horses, and wildlife, of these 49 grazing allotments is approximately 131, 311 AUMs. The capacity of these allotments has been adjusted over the years in response to mineral development, drought, wildland fires, availability of stock water, and rangeland condition.

Surface water sources that support livestock grazing and agriculture within the CESAs include reservoirs, perennial creeks, springs, and seeps. Improved water sources include developed springs, stock wells, stock ponds, water pipelines, and troughs. Livestock will generally congregate near these features. Cow-calf pairs, heifers, steers, cows, and sheep graze on residual forage in alfalfa fields, irrigated pastures, and rangeland within Eureka County and the adjoining



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Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

EXPLANATION

- Project Area Boundary
- Air Quality CESA
- Grazing Allotments
- Wildlife and Fisheries CESA

N

0 2.5 5 10 15 Miles

DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD
CHECKED: -	APPROVED: RFD	DATE: 08/01/2012

FILE NAME: p1635_Fig4-3-1_CumulativeGrazingAllotments.mxd

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Grazing Allotments within Air Quality and Wildlife and Fisheries CESAs Map

Figure 4.3.1

portions of Elko, Lander, White Pine, and Nye Counties. Existing livestock water use includes 613 stock water rights in the three hydrographic basins at a projected total rate of 1,447 afy. In addition, a substantial amount of four-strand (three barbed and one smooth wire on the bottom) wire fencing has been constructed within the CESAs. **Past and present range and habitat improvement projects have resulted in changes to** vegetation communities; the actual acreage for this has not been quantified; however, some of these uses are range improvements that include fences, cattleguards, noxious weed control, water troughs, spring improvements, wells, reservoirs, windmills and tanks, and pipelines. Figure 4.3.2 identifies the number of range improvements by township within the CESAs.

Areas under irrigation in Diamond Valley **were approximately 24,357 acres in 2011 (NDWR 2012).** Existing (active or recently active) agricultural development in Diamond Valley, identified using October 13, 2006, aerial photographs (Google Earth™), appears to remain at approximately **24,357** acres. Water use for irrigation increased from approximately 12,000 afy in 1965 to approximately 64,000 afy in 1990. Current water rights **have been identified as of June 2012, using NDWR data, at approximately 134,240 afy from underground sources. The perennial yield is 30,000 acre-feet per year**.

Areas under irrigation in Kobeh Valley were approximately **280** acres in **2011 (NDWR 2012)**. Existing agricultural development in Kobeh Valley, identified as of December 23, 2007, using aerial photographs, appears to be approximately 1,200 acres. Current water rights have been identified as of **June 2012, using NDWR data, at approximately 12,478 acre-feet per year from underground sources. The perennial yield for Kobeh Valley is 16,000 afy.**

Existing agricultural development in Pine Valley identified as of December 23, 2007, using aerial photographs, appear to remain at approximately 5,100 acres. Current water rights have been identified as of **June 2012, using NDWR data, as approximately 16,473 acre-feet per year from underground sources. The perennial yield for Pine Valley is 20,000 afy**.

Commercial pine nut harvesting occurs under permits issued by the BLM MLFO. Figure 4.3.3 shows the areas where this type of harvesting is permitted within the Native American Traditional Concern CESA, which comprises 382,428 acres and includes 167,441 acres of piñon-juniper and piñon only vegetation communities. The most recent highly productive year for commercial harvesting was in 1998 when 50,000 pounds of nuts were harvested and then again in 2004. Between these two years the production of pine nuts was very low. Yearly commercial pine nut harvesting is very sporadic, based on the tree production of cones and nuts. Also shown on this figure are the areas of piñon-juniper and piñon only vegetation communities, which comprise a total of 364,934 acres. Approximately 46 percent of these vegetation communities are subject to commercial harvest

Other forest product harvesting activities include, but are not limited to, the commercial and personal cutting of piñon and juniper for fire wood, the personal cutting of piñon for Christmas trees, the greenwood cutting of primarily juniper for fence posts, and commercial and personal harvesting pine nuts.

4.3.1.2 Reasonably Foreseeable Future Actions

Livestock grazing is expected to continue at management levels established in the various grazing allotments including the vicinity of the Proposed Action. Short-term (typically two to four years) adjustments to livestock numbers are expected in response to wildland fires, which affect forage levels. The following projects are proposed as part of ongoing livestock management programs at the BLM Mount Lewis, Tuscarora, and Egan Field Offices that would occur in the future, separate from mining-related activities:

- Livestock and drift fence construction;
- Water development (i.e., springs and wells);
- Permanent water haul locations;
- Sagebrush thinning;
- Seeding;
- Pipeline construction;
- Vegetation manipulation;
- Poisonous plant (i.e., tall larkspur) noxious weed population control;
- Fence relocation; and
- Reservoir construction.

It is reasonable to expect that future commercial pine nut harvesting would continue to be sporadic, based on the tree's production of cones and nuts. It is reasonable to expect that the BLM would continue to allow for forest product harvesting activities, including the cutting of piñon and juniper for firewood, the cutting of piñon for Christmas trees, as well as greenwood cutting of primarily juniper for fence posts.

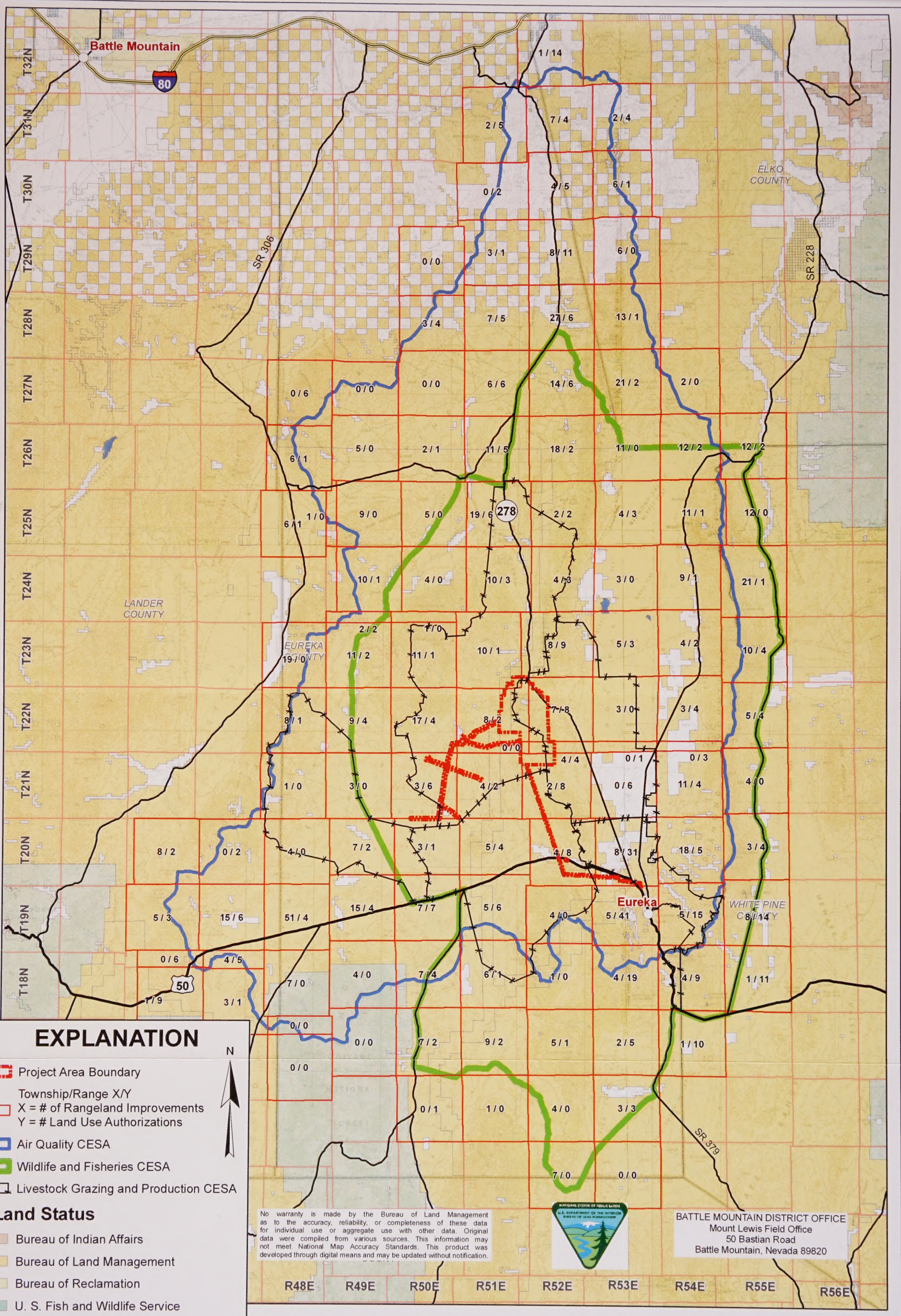
Continued agricultural activities in Diamond Valley, Kobeh Valley, and Pine Valley are reasonably expected to occur in the form of flood and pivot irrigation.

4.3.2 Utilities and Distribution

4.3.2.1 Past and Present Actions

Past utility and distribution actions include the development of roads, powerlines, and telecommunications, as well as public water supply and waste water systems. Roads have been developed by the State of Nevada (U.S. Highway 50, SR 278, and SR 892), Eureka, Lander, White Pine and Elko Counties, the BLM, and the USFS. The Town of Eureka is located in southeastern Eureka County. Individual ranches and farms comprise the remainder of the inhabited areas in southern Eureka County and the surrounding counties of Lander, Nye, White Pine, and Elko.

Three general types of roads have been developed within Eureka County and the adjoining portions of Elko, Lander, White Pine, and Nye Counties: paved roads, gravel surface roads, and dirt roads. Based on aerial photo review available from Google Earth™ and the Eureka County Road Map (Eureka County 2005), there are approximately 254 miles (12,315 acres) of paved roads in the CESAs, including U.S. Highway 50, SR 278, SR 892, and SR 379. In addition, there are approximately 60 miles of paved county roads in the Diamond Valley area. Paved roads in the Town of Eureka have been grouped with the town, which is discussed under Section 4.3.6.


Battle Mountain
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SR 228
ELKO COUNTY
LANDER COUNTY
EUREKA COUNTY
WHITE PINE COUNTY
Eureka
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EXPLANATION
Project Area Boundary
Township/Range X/Y
X = # of Rangeland Improvements
Y = # Land Use Authorizations
Air Quality CESA
Wildlife and Fisheries CESA
Livestock Grazing and Production CESA
Land Status
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
U. S. Fish and Wildlife Service
U. S. Forest Service
State of Nevada
Private
Water
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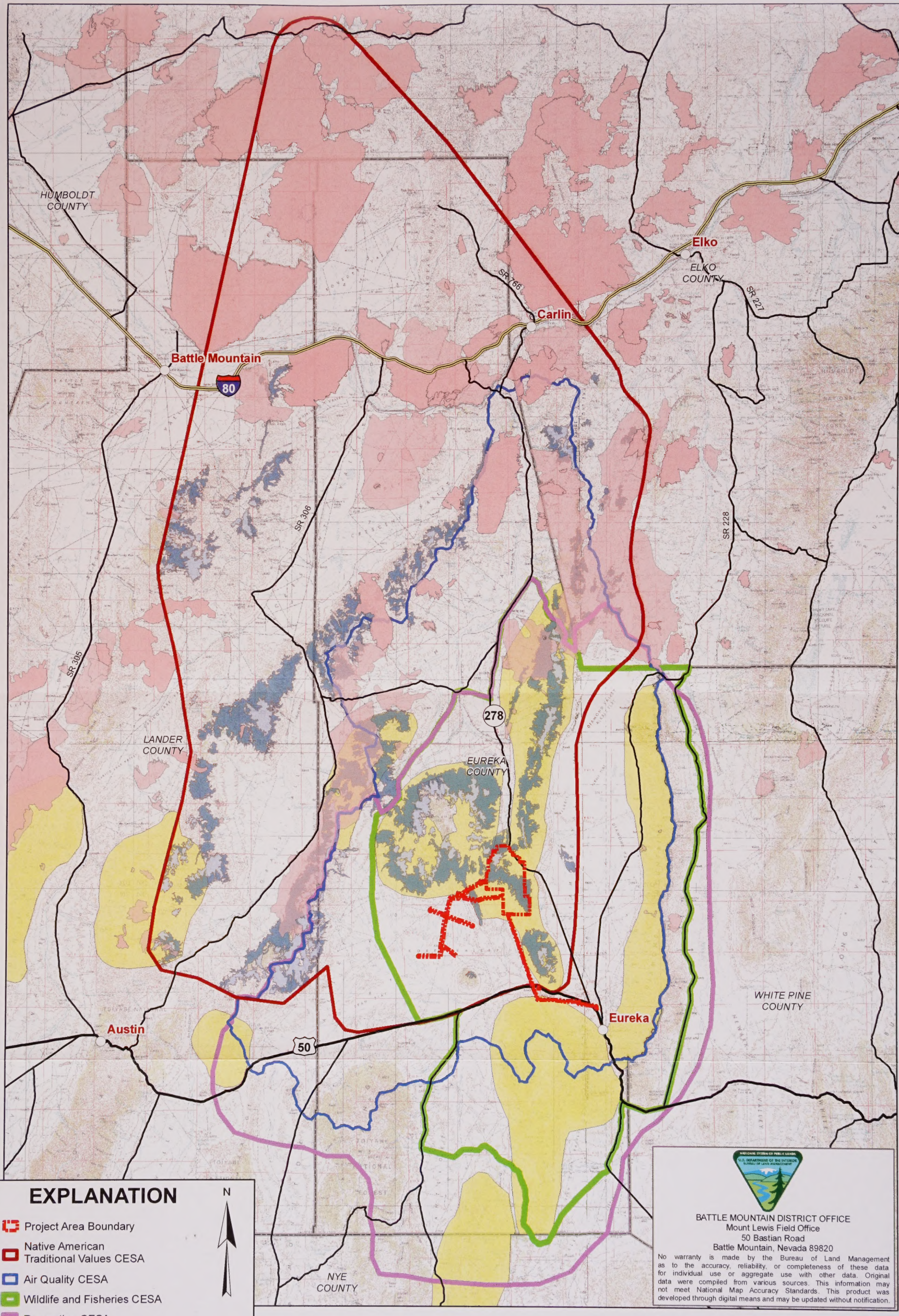
BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820
0 2.5 5 10 15 Miles
DESIGN: EMLLC
DRAWN: CVD/GSL
REVIEWED: RFD
CHECKED: -
APPROVED: RFD
DATE: 08/08/2012
FILE NAME: p1635_Fig4-3-2_RangelandLanduse.mxd
BUREAU OF LAND MANAGEMENT
MOUNT HOPE PROJECT
DRAWING TITLE:
Rangeland Improvements and Land Use Authorizations
Figure 4.3.2



EXPLANATION

- Project Area Boundary
- Native American Traditional Values CESA
- Air Quality CESA
- Wildlife and Fisheries CESA
- Recreation CESA
- Wildland Fire Activity (1999-2010)
- Piñon/Juniper Woodland
- Piñon Woodland
- Commercial Pine Nut Harvest Areas

N

0 5 10 15 20 Miles

DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD
CHECKED: -	APPROVED: RFD	DATE: 08/01/2012
FILE NAME: p1635_Fig4-3-3_PinyonVegInNativeAmericanCESA.mxd		

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50 Bastian Road
Battle Mountain, Nevada 89820

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BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Piñon-Juniper Vegetation Communities, Areas of Commercial Pine Nut Harvesting, and Wildland Fire Activity within the Native American Traditional Values CESA

Figure 4.3.3

Gravel and minor county roads are located throughout Eureka County and the surrounding counties in the CESAs and total approximately 750 miles (1,818 acres). There are an undetermined number of miles of dirt roads on public lands and NFS lands located within the CESAs in Eureka County and the surrounding counties.

Two major transmission powerlines are located in Eureka County, distributing power in the State of Nevada as part of the power grid. One is the Falcon-Gondor line that travels from north of Beowawe, Nevada, through the Project Area to U.S. Highway 50 and then east to Ely, Nevada. The other main line is an east-west line that parallels U.S. Highway 50. In addition, there are power distribution lines in Diamond Valley and Eureka. A powerline from Crescent Valley travels south to the Tonkin Springs Mine and then to the southwestern edge of the Roberts Mountains. Based on aerial photo review available from Google Earth™, there are approximately 282 miles (3,418 acres) of transmission lines in the CESAs. In addition, numerous lower voltage distribution lines provide power to two communities, ranches, and commercial activities located throughout Diamond and Kobeh Valleys. These lower voltage lines have not been specifically inventoried.

Within the CESAs, the BLM has issued approximately 375 authorizations for the development of telephone and fiber optic lines, powerlines, communication sites, pipelines, weather stations, global positioning system (GPS) sites, and wells. Figure 4.3.2 identifies the number of authorizations by Township within the CESAs.

The Town of Eureka and the Devil's Gate General Improvement District in Diamond Valley have a community water supply system, which is supplied primarily from ground water wells in Diamond Valley, as well as springs in the Pinto Summit area. There are currently approximately 1,700 afy of water rights that are designated for municipal use. There are small water supply systems at the Ruby Hill Mine and the Devils Gate Area in Diamond Valley, at Tonkin Springs in Pine Valley, and the City of Carlin. All other potable water within the CESAs is provided by individual domestic wells.

There are two major travel routes within the CESAs: U.S. Highway 50 and SR 278. As discussed above, there are a number of county roads within the CESAs. Based on data provided by the NDOT, SR 278 has approximately 580 daily trips within Diamond Valley, and approximately 270 of these trips continue north into Pine Valley and the remainder appear to be confined to Diamond Valley. U.S. Highway 50 appears to have 760 daily trips west of Eureka. Traffic around Eureka on U.S. Highway 50 east of the junction with SR 278 increases to 1,150 daily trips and in Eureka the daily trips increase to 1,950. Traffic on U.S. Highway 50 east of Eureka decreases to 560 daily trips. It is reasonable to assume that there are undocumented daily traffic trips on the county roads that are not represented in the traffic data from the NDOT.

4.3.2.2 Reasonably Foreseeable Future Actions

Development of additional roads is reasonable to anticipate; however, these roads are likely to be dirt roads created by recreational use of the public lands in the CESAs. The Town of Eureka is planning to expand beyond its current limits of development. Need for new transmission lines within this portion of the State of Nevada is not anticipated; however, it is reasonable to expect that additional distribution lines would be constructed.

It is reasonable to expect that traffic would increase in volume on the two major travel routes (U.S. Highway 50 and SR 278) in the CESAs, as well as on the other county roads in proportion to an expected increase in economic activity and population growth.

Wind power generation projects are considered RFFAs. These types of projects could be developed in the Diamond Mountains. Wind power generation projects generally require the installation of a number of wind turbines mounted on towers that range from 100 to 300 feet tall. The turbines are connected to the utility grid with transmission lines that are generally above ground. In addition, a network of roads is necessary for construction and maintenance of the turbines. The land around the turbines is generally fenced to limit public access and use, primarily for safety reasons. An area of up to 640 acres may be fenced.

4.3.3 Wildland Fires, Fuels Management, and Reseeding

4.3.3.1 Past and Present Actions

Wildland fires within the Battle Mountain District burned an average of approximately 5,900 acres per year over the ten-year period from 1988 to 1998, with an average of 33 fires per year. The 1999 fire season far exceeded these averages, with 84 wildland fires burning 274,500 acres. During the 2000 fire season, 71 wildland fires burned 7,440 acres.

There are 15 fire management units (FMUs) located within or overlapping the CESAs, which includes the Battle Mountain District and Elko Districts: Antelope Range; Battle Mountain; Big Smoky; Carico Lake; Charleston; Cortez; Crescent Valley; Diamond Mountains; Eureka/Diamond Valley; Fish Creek Range/Shoshone Mountains; Monitor/Smoky; Reese River/Grass Valley; Roberts; 3 Bars; and Tuscarora. Between 2001 and 2008, 79 wildland fires within the 15 FMUs burned 402,418 acres within the CESAs (Figure 4.3.3). A majority of the wildland fires were caused by lightning and are located in the northern portion of the Native American Traditional Values CESA. In addition, a few wildland fires occurred in the northern portion of the Water and Air CESAs, and the western margin of the Native American Traditional Values CESA. A total of 3,289 acres were seeded within the 2006 and 2007 burned areas in the CESAs within the MLFO.

In addition to the wildland fires, there have been a number of vegetation treatments or fuels reduction projects in the CESAs. These projects include the Red Hills Hazardous Fuels Reduction Project, the Tonkin Hazardous Fuels Reduction Project, the Seven Mile Hazardous Fuels Reduction Project (Phase I and II), the Eureka-South Diamond Wildland Urban Interface/Fire Defense Systems Project, and the North Diamond Allotment Vegetation Treatment.

The Red Hills project area encompasses 3,671 acres. When complete, this project will have resulted in broadcast prescribed fire on a total of 1,700 to 2,537 acres (46 to 70 percent of the Red Hills project area), up to 100 acres treated by pile or slash burning, and up to 400 acres treated utilizing mechanical methods.

The Decision Record for the Sulphur Springs Project was signed on September 17, 2009. This project will be implemented in phases and will not treat more than 2,000 acres per year over the life of the project. The project will treat 500 to 1,000 acres of piñon-juniper and sagebrush

vegetation with prescribed fire in a mosaic pattern, and treat 6,000 to 7,000 acres of piñon-juniper and sagebrush vegetation with mechanical methods (i.e., chainsaw, mastication, mowing, chipping) to create fuel breaks.

The Tonkin project encompasses 2,400 acres in the Tonkin Springs area at the northeast end of the Simpson Park Mountains. Approximately 200 acres of sagebrush habitat have been treated by mowing to create fuel breaks using a rotary mower towed by a tractor or a bull-hog. An additional 800 acres of piñon-juniper area have been thinned using chainsaws, a bull-hog, or a feller/buncher. The activity fuels generated by thinning the piñon-juniper were made available for firewood and fence posts. Any activity fuels that were not disposed of in this manner were either chipped or disposed of through pile burning. The footprint for pile burning did not exceed 200 acres.

The Seven Mile project is located approximately 30 miles southwest of Eureka, Nevada, on public lands administered by the MLFO and NFS lands administered by the USFS. The first phase of the project implemented various fuels management methods and techniques to create a series of fuel breaks. Up to approximately 3,323 acres were treated within the project area. The fuel breaks range in size from 131 acres to 570 acres. The second phase of the project is ongoing and consists of prescribed burning a maximum of 2,000 acres of BLM-administered land and 10,000 acres of NFS land annually. In addition, the BLM is also conducting nonfire preparatory treatment on 100 to 500 acres annually. Over the duration of the project, a maximum of approximately 18,794 acres will be treated on the BLM-administered lands and up to approximately 22,190 acres will be treated on the NFS lands for a maximum total of approximately 40,984 acres.

The Eureka-South Diamond Valley project is ongoing with up to 2,087 acres within the 7,400-acre project area to be treated utilizing various methods which include the following: high intensity low frequency grazing; green stripping (chipping or cutting and removing fuels); and mechanized or manual fuels removal using a feller/buncher or chainsaw.

The Northwest Diamond Valley project consists of five areas that measure 1,200 acres each. Treatments include reseeding burned areas, thinning, mowing, and reseeding sagebrush utilizing mechanical and chemical methods. The treatment area totals 6,000 acres for this project.

Approximately 2,000 acres of piñon-juniper were treated in the Willow and Vinini Creek drainages and the Henderson Summit area by the Bootstraps crew in 2008 and 2009 (BLM 2007). Under the Sulphur Springs Hazardous Fuels Reduction Project up to 3,000 acres of piñon-juniper will be removed or thinned and approximately 1,000 acres of greenwood will be cut at a rate of approximately 100 acres per year (BLM 2009).

4.3.3.2 Reasonably Foreseeable Future Actions

Fire suppression and treatments would continue to be an important component of land management within the CESAs as wildland fires are expected to continue. Wildland fires are expected to occur within the 15 FMUs and are likely to include areas previously burned and seeded. RFFAs also include additional fuels treatment projects, which have been proposed as outlined below.

Henderson-Romano Project:

- Treat 12,700 to 22,200 acres of piñon-juniper-sagebrush vegetation with prescribed fire in a mosaic pattern; and
- Treat up to 1,000 acres of piñon-juniper-sagebrush vegetation with mechanical methods (i.e., chainsaw, mastication, mowing, chipping) to create fuel breaks.

Henderson Creek Project:

- Treat up to 1,000 acres of piñon-juniper-sagebrush vegetation with mechanical methods (i.e., chainsaw, mastication) to create fuel breaks.

Mahogany Hills-Spring Valley:

- Treat 8,400 to 19,500 acres of piñon-juniper-sagebrush vegetation with prescribed fire in a mosaic pattern; and
- Treat up to 2,000 acres of piñon-juniper-sagebrush vegetation with mechanical methods (i.e., chainsaw, mastication, mowing, chipping) to create fuel breaks.

Fenstermaker Wash Project:

- Treat 14,000 to 33,500 acres of piñon-juniper-sagebrush vegetation with prescribed fire in a mosaic pattern; and
- Treat up to 2,000 acres of piñon-juniper-sagebrush vegetation with mechanical methods (i.e., chainsaw, mastication, mowing, chipping) to create fuel breaks.

It is reasonable to expect that future commercial pine nut harvesting would continue to be sporadic based on the trees' production of cones and nuts.

It is reasonable to expect that the BLM and local fire districts would conduct fire suppression activities when wildland fires occur. The scale and scope of those activities would be proportional to the size of the wildland fire and proximity to structures.

4.3.4 Habitat Stabilization, Rehabilitation, and Wild Horse Management Activities

4.3.4.1 Past and Present Actions

Past wildlife management actions have focused on the enumeration of wildlife game species and the management of these species for harvest.

The BLM Tuscarora Field Office has initiated activities to complete stream restoration projects on Trout Creek and Pine Creek.

The Pine Creek restoration project was conducted in 1992 and 1993 and included the reach from the Rand Ranch upstream to the confluence with Trout Creek. Head gates were installed, portions of the stream were fenced, and culverts were installed. The area involved in the restoration project has been recolonized by willows and the area is now stable. The cattle are allowed in the excluded area during the frozen winter months to feed. The cattle are limited in the amount of time spent in the riparian area. Wildland fires burned the riparian area during the 2007 fire season.

The Trout Creek restoration project was conducted in the mid-1980s and included four exclosures in the middle and upper reaches of Trout Creek. Trout Creek supports Lahontan cutthroat trout/rainbow trout hybrids. In 2002, the BLM constructed an additional exclosure along the lower reaches as part of an effort to protect areas seeded following the Bailey Fire. In 2004, the BLM completed fencing segments between the exclosures in an effort to create a riparian pasture. Other habitat restoration activities included the planting of mountain alder (*Alnus* sp.), aspen, and chokecherry along the stream channel in the four exclosures between 1994 and 2000.

The Willow Creek Canyon project would involve the removal of piñon and juniper trees over a 2,000-acre area within the Willow Creek drainage. Most trees that would be cut would be less than 12 feet high and six inches in diameter at breast height. The cut trees would be left where they are felled.

Within the Immediate Watershed CESA there are six areas that total approximately 21 acres of identified weeds that have been chemically treated and are monitored.

The Roberts Mountain Allotment exclosure consists of fencing along a four-mile stretch of Roberts Creek and associated riparian area in the southeast quarter of Section 35, T23N, R50E. The exclosure was constructed in 1990, and maintenance was last completed in 2004.

The 3 Bars East Range Exclosure consists of fencing that was completed in 1967 in Sections 22, 27, and 34, T23N, R49E, and Sections 4 and 9, T22N, R49E.

The Roberts Mountain WSA rehabilitation would involve the reclamation of unauthorized land uses within the WSA. This reclamation would include, but not be limited to, recontouring, scarification, and barricading of incursions and inventoried routes.

BLM wildlife management objectives in the 31 allotments that overlap with the wildlife, special status species, and migratory birds CESA are specifically defined in the Shoshone-Eureka, Egan, and Elko Rangeland Program Summaries (RPSs) and are outlined in Table 4.3-1. Within the wildlife, special status species, and migratory birds CESA, a short-term goal is to improve 867 acres of big game habitat to good condition. An overall objective is to manage rangeland habitats to maintain or enhance greater sage-grouse leks and nesting areas.

Four wild horse gathers have been completed within the Roberts Mountain HMA in 1987, 1995, 2001, and 2008. Prior to 2008, no formal gathers of wild horses had been conducted within the Whistler Mountain HMA by the BLM. In 2001, drought stressed horses were removed from the Whistler Mountain HMA in conjunction with the Roberts Mountain gather. The Kobeh Valley area outside the Fish Creek HMA was also gathered in 1994. Gathers of the Kobeh Valley outside the Fish Creek HMA were also completed in 2008.

Table 4.3-1: Summary of Allotments within the Wildlife, Special Status Species, and Migratory Birds Cumulative Effects Study Areas

Allotment[1]	Field Office	Active Livestock Use (AUMs)[4]	Wildlife Use (AUMs)	Wildlife Management Objectives
Fish Creek Ranch (I)	ML	4,013	2,441	Utilization of riparian habitat to be improved would not exceed 50 percent of key species[2]. In the short term, improve 322 acres of riparian habitat in the allotment to good condition. Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2,3]. In the long term, provide habitat to support 3,199 AUMs of big game use, in conformance with other objectives of the RMP. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.
Arambel (C)	ML	1,349	1,400	Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2, 3]. In the long term, increase big game habitat to support 1,450 AUMs of big game use, in conformance with other objectives of the RMP. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.
Ruby Hill (M)	ML	1,286	82	Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2,3]. In the long term, provide habitat to support 85 AUMs of big game use, in conformance with other objectives of the RMP. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.
Shannon Station (I)	ML	3,167	1,391	Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2]. In the long term, provide habitat to support 1,135 AUMs of big game use, in conformance with other objectives of the RMP. In the long term, within the Diamond Hills Habitat Management Plan (HMP) Area, improve 3,656 acres of terrestrial big game habitat to good, and 199 acres to excellent condition. Manage for upward trends on 4,021 acres[3]. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.
Silverado	EG	338	0	None.
Newark	EG	4,885	1,262	Protect greater sage-grouse breeding complexes by maintaining the big sagebrush sites within two miles of active strutting grounds for mid to late seral stage with a minimum of 30 percent shrub composition by weight. Protect ferruginous hawk nest sites by limiting utilization to 50 percent on winterfat flats within two miles of nest sites. Maintain habitat condition of meadows and riparian areas in good or better condition for mule deer and upland game by not exceeding utilization levels on perennial grasses (55 percent) and shrubs (45 percent) along streams and mesic meadows. Improve 3.5 miles of stream riparian habitat from poor/fair to good or better condition.
Strawberry	EG	1,032	0	None.

Allotment[1]	Field Office	Active Livestock Use (AUMs)[4]	Wildlife Use (AUMs)	Wildlife Management Objectives
Warm Springs	EG	7,744	10,284	Improve and maintain habitat condition of meadows and riparian areas from poor to good or better condition for mule deer and upland game. Utilization levels will not exceed 55 percent on perennial grasses and 45 percent on shrubs along stream riparian areas and mesic meadows. Limit utilization of browse species in critical deer winter range to a maximum of 45 percent of current annual growth. Protect greater sage-grouse breeding complexes by maintaining the big sagebrush sites within two miles of active strutting grounds for mid to late seral stage with a minimum of 30 percent shrub composition by weight. Protect ferruginous hawk nest sites by limiting utilization to 50 percent on winterfat flats within two miles of nest sites. Improve three miles of stream riparian habitat condition from poor/fair to good or better (Deadman and Old Deadman Creeks).
Cold Creek	EG	5,094	832	Maintain habitat condition of meadows and riparian areas from poor to good or better condition for mule deer and upland game by not exceeding utilization levels on perennial grasses (55 percent) and shrubs (45 percent) along stream riparian areas and mesic meadows. Protect greater sage-grouse breeding complexes by maintaining the big sagebrush sites within two miles of active strutting grounds for mid to late seral stage with a minimum of 30 percent shrub composition by weight. Protect ferruginous hawk nest sites by limiting utilization to 50 percent on winterfat flats within two miles of nest sites. Maintain and improve 9.25 miles of stream riparian habitat to good or better condition.
North Springs	ML			Part of Three-Mile in the RPS.
Willow Racetrack (M)	ML	250	0	None.
Railroad Pass	EG	1,364	682	Maintain habitat condition of meadows and riparian areas in good or better condition for mule deer and upland game. Protect greater sage-grouse breeding complexes by maintaining the big sagebrush sites within two miles of active strutting grounds for mid-late seral stage with a minimum of 30 percent shrub composition by weight. Protect ferruginous hawk nest sites by limiting utilization to 50 percent on winterfat flats within two miles of nest sites. Maintain 0.25 mile of stream riparian in good or better condition.
Corta	ML			Managed with the Railroad Pass Allotment.

Allotment[1]	Field Office	Active Livestock Use (AUMs)[4]	Wildlife Use (AUMs)	Wildlife Management Objectives
Diamond Springs (I)	ML	3,179	1,433	Utilization of riparian habitat to be improved would not exceed 50 percent on key species[2]. In the short term improve 69 acres within the Diamond Hill HMP Area to good condition. Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2]. In the long term, provide habitat to support 1,158 AUMs of big game use, in conformance with other objectives of the RMP. In the long term, within the Diamond Hills HMP Area, improve 3,136 acres of terrestrial big game habitat to good and 523 acres to excellent condition. Manage upward trends on 3,920 acres[3]. In the short term, within the Diamond Hills HMP Area, improve 35 acres of riparian/waterfowl habitat to good condition[3]. In the long term, within the Diamond Hills HMP Area, improve 40 acres of riparian/waterfowl habitat to good condition[3]. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.
Union Mountain (I)	TU	1,488	469	Manage rangeland habitat and forage condition to support 1,110 AUMs for reasonable numbers of mule deer. Maintain or improve to at least good condition all mule deer crucial habitat. Manage rangeland to protect or enhance crucial greater sage-grouse strutting or nesting habitat. Improve and maintain meadow and riparian areas for mule deer and greater sage-grouse. Utilization levels will not exceed 50 percent on meadow and riparian areas.
Bruffy (I)	TU	1,731	231	Manage rangeland habitat and forage condition to support 460 AUMs for reasonable numbers of mule deer. Maintain or improve to at least good condition all mule deer crucial habitat. Manage rangeland to protect or enhance crucial greater sage-grouse strutting or nesting habitat. Improve and maintain meadow and riparian areas for mule deer and greater sage-grouse. Utilization levels will not exceed 30 percent on meadow and riparian areas.
Mineral Hill (I)	TU	1,555	137	Manage rangeland habitat and forage condition to support 276 AUMs for reasonable numbers of mule deer. Maintain or improve to at least good condition all mule deer crucial habitat. Manage rangeland to protect or enhance crucial greater sage-grouse strutting or nesting habitat. Improve and maintain meadow and riparian areas for mule deer and greater sage-grouse. Utilization levels will not exceed 50 percent on meadow and riparian areas.
Flynn/ Parman (I)	ML	1,399	582	Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2,3]. In the long term, provide habitat to support 565 AUMs of big game use, in conformance with other objectives of the RMP. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.

Allotment[1]	Field Office	Active Livestock Use (AUMs)[4]	Wildlife Use (AUMs)	Wildlife Management Objectives
JD (M)	ML	8,200	594	Fenced riparian habitat along Tonkin Creek will receive no utilization. In the short term, improve 0.8 mile of riparian/aquatic habitat to good condition on Tonkin Creek including ten acres of riparian habitat. Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2,3]. In the long term, provide habitat to support 1,289 AUMs of big game use, in conformance with other objectives of the RMP. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.
Roberts Mountain (I)	ML	13,238	1,735	Utilization of riparian habitat to be improved would not exceed 50 percent on key species[2]. In the short term, improve 15 miles of riparian or aquatic habitat to good condition on the following streams: seven miles of Roberts Creek; five miles of Vinini Creek; and three miles of Henderson Creek, including 180 acres of associated riparian habitat and 43 acres of other riparian habitat in the allotment. Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2]. In the long term, provide habitat to support 2,450 AUMs of big game use, in conformance with other objectives of the RMP. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP. In the long term, within the Roberts Mountain HMP Area, improve 9,850 acres of terrestrial big game habitat to good and 473 acres to excellent condition. Stop downward trends on 3,256 acres and manage for upward trends on 10,811 acres[3].
North Diamond (C)	ML	4,151	436	Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2,3]. In the long term, provide habitat to support 423 AUMs of big game use, in conformance with other objectives of the RMP. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.
Three Mile (I)	ML	1,001	496	Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2]. In the long term, provide habitat to support 401 AUMs of big game use, in conformance with other objectives of the RMP. In the long term, within the Diamond Hills HMP Area, improve 2,004 acres of terrestrial big game habitat to good, and 23 acres to excellent condition. Stop downward trends on 466 acres and manage for upward trends on 2,097 acres[3]. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.
Romano (I)	ML	2,887	519	Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2,3]. In the long term, provide habitat to support 533 AUMs of big game use, in conformance with other objectives of the RMP. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.

Allotment[1]	Field Office	Active Livestock Use (AUMs)[4]	Wildlife Use (AUMs)	Wildlife Management Objectives
Black Point (I)	ML	4,633	2,450	Utilization of riparian habitat to be improved would not exceed 30 percent on key species[2]. In the short term, improve 5.4 miles of riparian/aquatic habitat to good condition on the following streams: 3.2 miles of Cottonwood Creek; and 2.2 miles of Hildebrand Creek, including 65 acres of associated riparian habitat and 100 acres of other riparian habitat in the allotment. Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2]. In the long term, provide habitat to support 1,979 AUMs of big game use, in conformance with other objectives of the RMP. In the long-term, within the Diamond Hills HMP Area, improve 8,246 acres of terrestrial big game habitat to good and 375 acres to excellent condition. Manage for upward trends on 8,996 acres[3]. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.
Spanish Gulch	ML			Managed with Shannon Station.
Lucky C (C)	ML	3,054	570	Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2,3]. In the long term, provide habitat to support 673 AUMs of big game use, in conformance with other objectives of the RMP. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.
Santa Fe/ Ferguson (I)	ML	2,365	38	Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2]. In the long term, provide habitat to support 285 AUMs of big game use, in conformance with other objectives of the RMP. In the long term, within the Simpson Park HMP Area, improve 4,904 acres of terrestrial big game habitat to good and 157 acres to excellent condition. Stop downward trends on 1,308 acres and manage for upward trends on 5,257 acres[3]. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.
3 Bars (I)	ML	4,589	1,000	Fenced meadows will receive no livestock utilization until the riparian habitat has achieved good condition. Thereafter, utilization not to exceed 35 percent on sedge and grasses along the stream bank. Utilization of unfenced riparian habitat to be improved and managed for good condition is 50 percent or less on key species[2]. In the short term, improve and maintain in good condition 78 acres of riparian habitat. Utilization of key browse species not to exceed 50 percent in terrestrial big game habitat areas[2]. In the long term, provide habitat to support 1,415 AUMs of big game use, in conformance with other objectives of the RMP. In the long term, within the Simpson Park HMP Area, improve 1,724 acres of terrestrial big game habitat to good, and 83 acres to excellent condition. Stop downward trends on 570 acres and manage for upward trends on 1,893 acres[3]. In the long term, within the Roberts Mountain HMP Area, improve 5,075 acres of terrestrial big game habitat to good and 243 acres to excellent condition. Stop downward trends on 1,678 acres and manage for upward trends on 5,570 acres[3]. Manage rangeland to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.

Allotment[1]	Field Office	Active Livestock Use (AUMs)[4]	Wildlife Use (AUMs)	Wildlife Management Objectives
Duckwater (I)*	EG	7,415	1,753	Manage rangeland habitat and forage condition to support reasonable numbers of wildlife as follows: deer 2,313 AUMs; and antelope 510 AUMs. Maintain or improve mule deer and antelope habitats to good or better condition. Improve and maintain habitat condition of meadow and riparian areas in poor/good condition to good or better for pronghorn antelope, mule deer, and upland game. Utilization levels will not exceed 55 percent on perennial grasses and grass-like species and 45 percent on shrubs along stream riparian areas and mesic meadows. Protect greater sage-grouse breeding complexes. Protect ferruginous hawk nest sites.
South Buckhorn (I)*	TU	7,497	566	Manage rangeland habitat and forage condition to support 2,058 AUMs for reasonable numbers of mule deer. Maintain or improve to at least good condition all mule deer crucial habitat. Manage rangeland to protect or enhance crucial greater sage-grouse strutting or nesting habitat. Improve and maintain meadow and riparian areas for mule deer and greater sage-grouse. Utilization levels will not exceed 50 percent on meadow and riparian areas.
Willow Ranch (M)*	ML	3,621	8	In the long term, provide habitat to support 159 AUMs of big game use, in conformance with other objectives of the RMP. Manage rangeland habitat to maintain or enhance greater sage-grouse strutting and nesting areas, in conformance with other objectives of the RMP.
Totals		**102,525**	**31,391**	

1 - Parenthetical after allotment name refers to BLM condition: I - improve the current unsatisfactory condition; M - maintain the current satisfactory condition; C - manage in a custodial fashion. ML = Mount Lewis Field Office; EG = Egan Field Office; TU = Tuscarora Field Office.
2 - Utilization limits refer to use by all herbivores. The utilization limits alone may only maintain existing conditions, but when coupled with other management practices, such as deferment and rest rotation grazing, are expected to allow for improvement of conditions.
3 - For those acres not identified for improvement, ecological conditions, wildlife habitat, and wild horse and burro habitat will be managed to prevent downward trends.
4 - AUMs were compiled from BLM **FMUD** and BLM grazing permits.
* - The asterisk identifies those allotments for which less than approximately one percent of the allotment is within the wildlife, special status species, and migratory birds CESA.

As noxious weed infestations are identified and determined a priority, the BLM and the Eureka County Weed District conduct weed control activities in the form of chemical treatment (Figure 4.3.4).

4.3.4.2 Reasonably Foreseeable Future Actions

The 3-Bars Ecosystem and Landscape Restoration Project is a landscape scale restoration project that seeks to restore and enhance key vegetative communities, ecosystem functionality, and reduce fire risk over a 750,000-acre portion of central Eureka County. The need for change has been identified and documented using an interdisciplinary approach. Many factors have

contributed to the overall decline of the 3 Bars ecosystem. Collectively, these factors incrementally increased the risk of loss of important ecosystem components. These components include the following: wildlife and habitat components; woodland and rangeland values; wetland and riparian components; as well as the integrated components that define Native American Traditional Values and cultural resource significance. Treatments would be proposed that address multiple objectives with multiple resource benefits. Treatments would potentially use a combination of passive, mechanical, chemical methods as well as prescribed fire applications to meet predetermined resource objectives. **An Administrative Draft** EIS is expected, at the present time, in the third quarter of 2012 **for the 3 Bars project**.

It is reasonable to assume that weed identification, treatment, and monitoring would continue within the Immediate Watershed CESA.

Within the wildlife, special status species, and migratory birds CESA, as identified in the Shoshone-Eureka, Egan, and Elko RPSs and outlined in Table 4.3-1, a long-term goal is to increase AUMs available to wildlife by 5,601 AUMs and to improve 34,939 acres of big game habitat to good condition and 1,877 acres to excellent condition. Another long-term goal is to stop the downward trend on 7,278 acres and manage for upward trends on 38,544 acres.

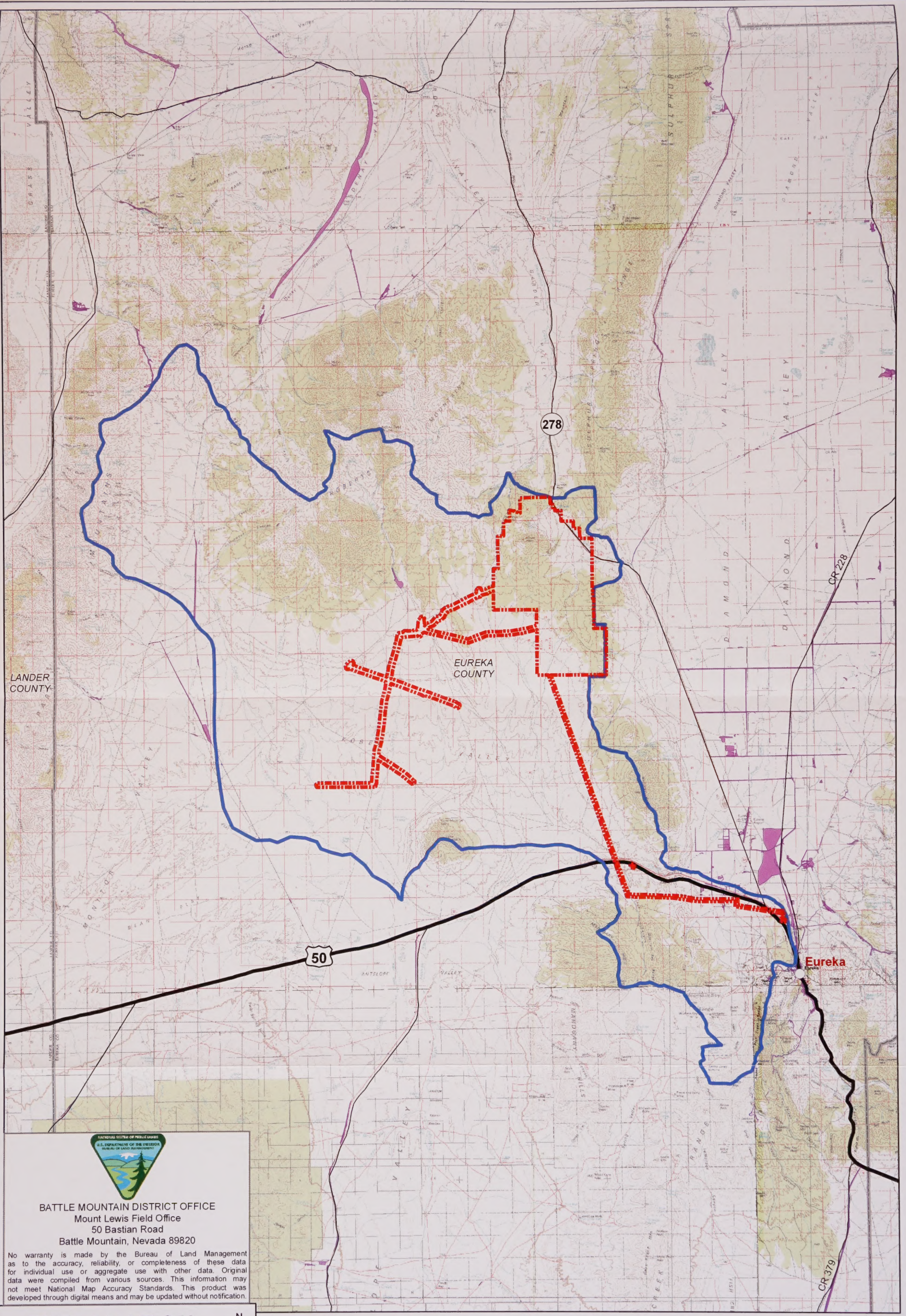
It is reasonable to expect that the BLM would continue wild horse management activities in the form of gathers, AML review and adjustment, and implementation of habitat improvement projects.

4.3.5 Recreation

4.3.5.1 Past and Present Actions

Dispersed recreation opportunities include sightseeing, pleasure driving, rock collecting, photography, winter sports, **OHV** use, mountain biking, picnicking, camping, fishing, hunting, and hiking. This wide range of opportunities is possible because virtually all of the public lands in the CESAs are accessible and offer a variety of settings suitable for different recreational activities. Developed recreational facilities are located at the Hickison Petroglyph Recreation Site, which is located approximately 24 miles east of Austin, Nevada, along U.S. Highway 50. The opportunities include petroglyph viewing, hiking, picnicking, hunting, horseback riding, and camping. Originally developed in 1968, the site has 16 camp sites, four picnic sites, three restrooms, and a 0.3 mile interpretive trail. One to five special recreation permits are approved each year. The majority of special recreation permits are for guided hunts. In addition, there is a Pony Express re-ride each year in June along the Pony Express National Historic Trail.

Dispersed recreational activities have not required major improvements for recreational purposes, as existing roads and trails are the primary facilities associated with these activities. Surface disturbance has occurred as a result of recreation activities and is either accounted for under other categories or the disturbance has not been quantified. There are three reservoirs in Pine Valley (Tonkin, Lower Tonkin, and JD), which total 60 acres and are on private and public lands.



BATTLE MOUNTAIN DISTRICT OFFICE
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EXPLANATION

- Project Area Boundary
- Invasive Non-Native Species CESA
- Weed Treatment Areas

N

0 1 2 4 6 8 Miles

DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD
CHECKED: -	APPROVED: RFD	DATE: 08/01/2012
FILE NAME: p1635_Fig4-3-4_NoxiousWeeds.mxd		

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Noxious Weed Occurrences within the Invasive Non-Native Species CESA

Figure 4.3.4

4.3.5.2 Reasonably Foreseeable Future Actions

Recreational use within the CESA is likely to increase proportionally to changes in population, with dispersed outdoor recreational activities being the predominant type of recreation. In addition, construction is underway to develop a 30- to 50-mile hiker/equestrian trail system in the Simpson Park Range immediately north of the Hickison Petroglyph Recreation Site. An associated trailhead is completed. Equestrian camping facilities are also being contemplated in the area immediately adjacent to the existing campground. The design or layout of these proposed developments has not been developed.

4.3.6 Land Development

4.3.6.1 Past and Present Actions

The Town of Eureka comprises approximately 880 acres. The majority of the town area lies to the west of U.S. Highway 50. In addition, approximately 700 acres have been identified for residential or commercial development in the Diamond Valley area. The Town of Eureka and the Diamond Valley community consist of roads, residences, commercial and public buildings, powerlines, fences, and other related development.

In the current RMP, approximately 23,000 acres within Diamond Valley and the Project Area have been identified for disposal; however, no specific proposals for disposal have been identified.

Currently and in the past there have been minimal industrial activities within the CESAs with the exception of the mineral development activities discussed under Section 4.3.7. **There are also cement batch plants in the Town of Eureka and Diamond Valley**.

4.3.6.2 Reasonably Foreseeable Future Actions

Future public land sales are considered possible under RFFAs. The BLM is currently evaluating a proposed 150-acre land sale associated with the Ruby Hill Mine. Other potential land sales could include lands associated with community development or specific resource development projects, such as the Proposed Action. Any future land sales that were not within disposal areas identified in the current RMP would be subject to congressional requirements in the implementing legislation. Public lands converted to private ownership would be subject to all applicable state environmental laws. If a land sale involved community development land, there would likely be a future change in use from wildlife habitat to residential and commercial development. If a land sale involved a resource development project, current resource activities would likely continue into the future with possible expansion. Long-term use of the land after the resource activity has been completed may be an activity or use other than livestock grazing and production and wildlife habitat, which would be the use if the land remained under BLM management. Long-term use of privatized land would be subject to any covenants agreed to at the time of sale. There is potential for the development of a residential area on private land in Kobeh Valley at the Bartine Ranch and in Pine Valley at the JD Ranch.

A major portion of the Project Area is identified in the RMP for disposal; therefore, it is reasonable that this portion of the Project Area would become private land through a RFFA by

the BLM to sell the land. Information on areas identified for disposal can be found on the BLM MLFO website (http://www.blm.gov/nv/st/en/fo/battle_mountain_field/blm_programs/planning/resource_ management.html).

4.3.7 Mineral Development and Exploration

4.3.7.1 Past and Present Actions

Based on information from the Eureka County and White Pine County reports by the Nevada Bureau of Mines and Geology, there are ten historic mining districts that occur within the geology and minerals CESA in Eureka County: Alpha; Antelope; Diamond; Eureka; Fish Creek; Lone Mountain; Mineral Hill; Mount Hope; Roberts; and Union (Roberts et al. 1967). There is one historic mining district that occurs within the geology and minerals CESA in White Pine County, Newark (Hose and Blake 1976). The Alpha District is located in the Sulphur Springs Range north of the Project Area. It was likely active prior to 1900; however, records indicate a small production of Ag, with Pb, Zn, and Cu between 1909 and 1917. The Antelope District is located on the western flank of the Roberts Mountains and was discovered in the 1860s or 1870s. In 1950 and 1951 production included 261 ounces of Ag, as well as Pb and Zn for a total value of $25,604 (1952 dollars). The Diamond District is located north of the Town of Eureka on the west flank of the Diamond Mountains and was discovered in 1864. Very limited mining occurred prior to 1936. Between 1936 and 1955, 31 ounces of Au and 51,898 ounces of Ag, as well as Cu, Pb, and Zn were produced for a total value of $184,520 (1955 dollars).

The Eureka District, which is located in the vicinity of the Town of Eureka, was the most productive district in the area with a total production value of $122 million (1962 dollars). Production included Au (148,283 ounces), Ag (3,173,838 ounces), Cu (2,079,408 pounds), Zn (14,276.131 pounds), and Pb (60,589,509 pounds).

The Fish Creek District is located southwest of the Town of Eureka in the Fish Creek Range and the Mahogany Hills and was discovered in the late 1800s. Production has been very limited. In 1938, Ag (238 ounces) and Pb were produced at a value of $400 (1938 dollars). In 1955, Au (233 ounces) and Pb were produced at a value of $1,239 (1955 dollars).

The Lone Mountain District is located on the north flank of Lone Mountain and was discovered in 1920. Production of Zn (4,952,627 pounds) along with Ag (4,040 ounces), Cu, and Pb from 1938 to 1964 had a value of $781,102 (1964 dollars).

The Mineral Hill District is located on the northwest flank of the Sulphur Springs Range and was discovered in 1868. Production in the district occurred through 1938 with **Au** (145 ounces), Ag (71,250 ounces), Cu, Pb, and Zn. The total value of the production was $2,500,662 (1938 dollars).

The Mount Hope District is located on the southeast flank of Mount Hope and is the location of the Project. The district was discovered in 1870. Production occurred between 1941 and 1947 with the principal product being Zn (10,189,454 pounds), along with Au (83 ounces), Ag (63,697 ounces), Cu (57,675 pounds), and Pb (441,103 pounds). The total value was $1,335,393 (1947 dollars).

The Roberts District is located on the west flank of the Simpson Park Mountains and was discovered in 1870. Minor production occurred around 1910. Between 1948 and 1962 Au (114 ounces), Ag (417 ounces), Cu, Pb, and Zn were produced with an approximate value of $5,961 (1962 dollars).

The Union District is located on the north flank of the Sulphur Springs Range and was discovered in 1886. The main production occurred between 1915 and 1918 with a value of $175,802 (1918 dollars). In 1951, production included Ag (375 ounces) and Pb with a value of $1,896 (1951 dollars) and in 1952 production of Ag (381 ounces) and Pb with a value of $1,221 (1952 dollars).

The Newark District is located on the eastern flank of the Diamond Mountains and was discovered in 1866. Production occurred sporadically between 1867 and 1957. Between 1942 and 1944 W ore production was valued at $73,000. The total value of the historic production in 2006 dollars (using the CPI to adjust for inflation) is $870,681,793 for the Newark District. This value is likely conservative because data from the districts with multiple years of production were adjusted for inflation based on the last year of production. Surface disturbance associated with these operations has not been quantified; however, the value is likely in the range of several hundreds to a few thousand acres.

From the mid-1960s up to the present, mineral resource development within the CESA has principally been **Au** production from four mining operations: Gold Bar; Windfall; Tonkin Springs; and Ruby Hill. The Antelope district in the southern Roberts Mountains contains one main Au deposit (Gold Bar), five satellite deposits, and other resources. The Gold Bar deposit was discovered in 1983 and approximately 500,000 ounces of Au have been recovered from a resource of 1.6 million ounces. The properties are currently in closure. The Ruby Hill mine is located in the Eureka mining district and is currently operating. The West Archimedes portion of the Ruby Hill mine produced 755,000 ounces of Au between 1997 and 2002. Additional mineralized areas, including East Archimedes, Deep East, and Achilles, have been identified. The East Archimedes deposit at Ruby Hill had approximately 1.08 million ounces of proven and probable Au reserves at year end 2006. The Windfall-Rustler and Lookout Mountain (Ratto Canyon) mines are located in the southern portion of the Eureka mining district and exploration is currently ongoing. **Au** production of 200,000 ounces was recorded in 1993. The Tonkin Springs Mine property is located in the Roberts Mining District. Small scale mining and exploration occurred in the 1990s. A total of 100,000 ounces of Au reserve was defined in the early 2000s; however, no recent mining has occurred. The Tonkin Springs Mine is currently in closure.

It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District and the disturbance associated with these operations is estimated to be approximately 200 acres. Current minerals activities within all the CESAs are shown on Figure 4.3.5. There are approximately **163** Notice-level operations and **27** plans of operations that are authorized under 43 CFR 3809 by the BLM. **Past and present surface disturbance associated with sand and gravel operations is approximately 1,759 acres.** The total surface disturbance associated with these operations is **15,085** acres. This value includes the **Au** producing operations from the 1980s and 1990s.

4.3.7.2 Reasonably Foreseeable Future Actions

RFFAs for minerals projects include only those projects where the BLM has received a Plan of Operations and has been deemed complete. An additional **10,177** acres of surface disturbance is reasonably foreseeable for future minerals activities.

4.3.8 Hazardous/Solid Waste and Hazardous Materials

4.3.8.1 Past and Present Actions

The past uses of hazardous materials include chemicals used at the historic Mount Hope mines. Use of these chemicals ceased in the 1950s, and any stored chemicals were removed by EML. Other past uses of hazardous materials include fuels and other petroleum products associated with the mining and exploration activities, which were used to maintain and operate the mining and exploration equipment and vehicles. Vehicles using SR 278 contain petroleum products. Maintenance of SR 278 by the NDOT has included the application of herbicides annually within the highway ROW to minimize vegetation. It is likely that some petroleum products have been spilled as the result of vehicle accidents on SR 278; however, the amounts are not readily quantifiable. SR 278 has been used in the past to transport hazardous materials, including petroleum, to nearby mining operations, towns, and ranches. Currently, there are approximately ten loads per day of fuels, cyanide solutions, acid, and explosives transported on SR 278 and U.S. Highway 50 (Enviroscientists 2011b).

There is a Class III waivered landfill associated with the Ruby Hill Mine, which is within the one-mile buffer around the Hazardous Materials and Transportation and Access CESA. This landfill has been operated since the 1990s and only accepts non-liquid, non-hazardous, or non-putrescible wastes from the mining operation. The Eureka County Landfill, located to the northeast of the Town of Eureka, accepts non-hazardous wastes at an approximate average rate of 20 tpd and has a total area of approximately 40 acres. The BLM and Eureka County are currently working on plans to expand the landfill.

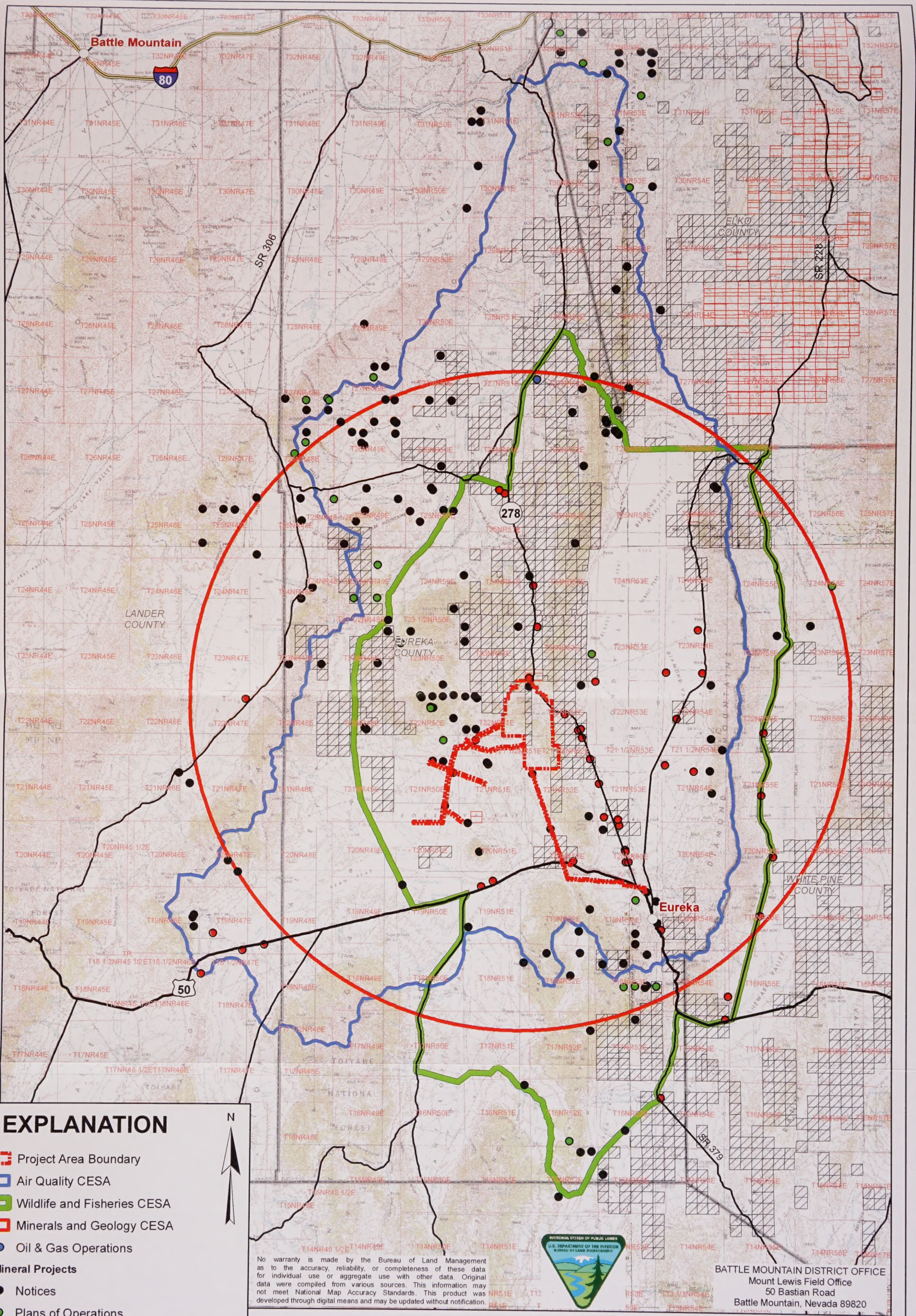
4.3.8.2 Reasonably Foreseeable Future Actions

It is reasonable to expect that SR 278 would continue to be used as a transportation route for hazardous materials at levels that are consistent with, or somewhat greater than, current levels. In addition, the NDOT would continue with their application of herbicides within the SR 278 ROW. It is expected that the landfills at the mining operations would maintain their current size for the duration of the cumulative analysis; however, it is reasonable to expect that the Eureka Landfill would have up to a three-fold expansion in size and capacity.

4.3.9 Oil, Gas, and Geothermal Leasing and Development

4.3.9.1 Past and Present Actions

As shown on Figure 4.3.5, there are oil and gas leases throughout the CESAs for air, minerals, and wildlife. In addition, four oil fields have been developed in Pine Valley located in the northern portion of the minerals CESA (shown as a blue dot on Figure 4.3.5). All four of these



EXPLANATION

- Project Area Boundary
- Air Quality CESA
- Wildlife and Fisheries CESA
- Minerals and Geology CESA
- Oil & Gas Operations

Mineral Projects

- Notices
- Plans of Operations
- Gravel Operations

Oil and Gas Leases

- Authorized
- Pending

N

0 5 10 15 Miles

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Mineral Projects and Oil and Gas Use within the CESAs

Figure 4.3.5

oil fields are located within the area of Eureka County administered by the Elko BLM and had a production of 3,369,329 barrels between 1990 and 2006.

Approximately 283 acres of surface disturbance is associated with the current oil and gas development. There is also one project involving drilling and exploration in Sections 7 and 9, T27N, R52E. **An oil spill in the Pine Valley oil field at the Blackburn well resulted in approximately 3.6 acres of surface disturbance associated with the spill (Personal Communication, Thomas Schmidt, BLM, June 6, 2012).**

The CESAs overlap the area analyzed in the EA for Oil and Gas Leasing within Portions of the Shoshone-Eureka Planning Area (NV063-EA06-092) (BLM 2006). The assessment area in that EA includes the eastern portion of the Shoshone-Eureka Planning Area with lands in the southern CESA portions of Eureka and Nye Counties. According to the Nevada Bureau of Mines and Geology Bulletin 104, historic interest in oil and gas exploration within the area has been limited (Garside et al. 1988). Between 1946 and 2004, 39 exploration wells were drilled (http://www.nbmg.unr.edu 2006). None of these wells resulted in production. The discovery of oil in Blackburn Field in Pine Valley in 1982 led to exploration interest in Eureka County, which had not seen interest prior to 1982. Although four oil fields have been developed within the area of Eureka County administered by the Elko BLM, no production wells have been developed within other portions of Eureka County. Production in the Railroad Valley area of Nye County led to increased interest as well; however, as of 2004, no exploration wells had been drilled in the Nye County portion of the CESAs.

As described in EA NV063-EA06-092, the overall potential for oil and gas exploration and development within the CESAs would be moderate to high because it is on a trend between the Pine Valley and Railroad Valley production wells. In addition, oil and gas interest has been increasing in the area. In the assessment area for EA NV063-EA06-092, an average of one exploration well was drilled per year between the years of 1980 and 2004 versus a total of 13 exploration wells drilled in the 33 years prior. Exploration interest since 1980 has focused specifically on Eureka County.

There are currently no geothermal leases within the CESAs.

4.3.9.2 Reasonably Foreseeable Future Actions

As energy demands increase and advancements in exploration and drilling technology lead to development of previously unexplored resources, oil and gas leasing and exploration are likely to increase. Increased economic incentive may also lead to an increase in exploration and development as oil prices rise. EA NV063-EA06-092 assumes that an estimated two wells would be drilled each year over the next ten years and that one of the 20 wells would be viable for production. Based on this assumption, the total surface disturbance from exploration activity is estimated at 290 acres; exploratory well pad construction is estimated at 40 acres; disturbance from development of access roads is estimated at 240 acres; and gravel pit expansion associated with exploration is estimated at 2.5 acres. Surface disturbance from oil and gas exploration could total a maximum of 572.5 acres, of which 16.5 acres would not be reclaimed within the ten year scenario. The total surface disturbance from the nine production well pads is estimated at 18 acres; disturbance from the construction of production roads is estimated at 34 acres; and gravel pit expansion for oil and gas production is estimated at 2.5 acres. Surface disturbance

from oil and gas production over the ten-year planning period could total a maximum of 54.5 acres. For the portion of the oil and gas field that is within the Elko BLM jurisdiction the leasing of parcels for oil and gas is expected to continue in the future as energy demand continues to increase. No exploration or development permit applications for projects in the CESA have been submitted to the BLM. It is likely that there would be additional disturbance associated with oil and gas exploration and development in that region. All future proposed actions within the CESAs would be analyzed when a lessee submits plans for the action.

4.3.10 Summary of Surface Disturbance

The total surface disturbance associated with all past and present actions, as outlined above and summarized in Table 4.2-3, is 391,**065** acres. The total surface disturbance associated with all RFFAs, as outlined above and summarized in Table 4.2-3, is **584,489** acres. Therefore, the total surface disturbance associated with all past actions, present actions, and RFFAs is **975,554** acres. The total surface disturbance associated with the Proposed Action is 8,3**55** acres.

4.4 Evaluation of Potential Proposed Action Cumulative Impacts

This section presents descriptions of the collective or additive impacts of combining past, present, and RFFAs associated with mineral development and other land uses in the southern Eureka County area. Past, present, and reasonably foreseeable future land uses and human caused and natural occurrences are described in Section 4.3. Potential cumulative effects for some resources are based on predictive modeling results (air quality and water quality/quantity) as described below.

Criteria for assessing the significance of potential impacts to the resources are the same as those presented in Chapter 3.

4.4.1 Water Resources - Water Quantity

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quantity perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the ground water flow model and pit lake chemistry model as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan, as outlined in Section 2.1.16 of this EIS.

4.4.1.1 Surface Water Quantity

Past Actions - The past actions that had the potential to affect surface water resources were mining-related and grazing-related actions. The past mining operations were of smaller scale and consisted of underground operations with limited surface disturbance. The other past actions that had the potential to affect surface water resources were agriculture related ground water pumping in Diamond Valley, which commenced in the late 1950s, and has associated indirect effects on spring and stream flows.

Present Actions - The present and Proposed Actions that would potentially affect surface water resources are grazing and mining-related actions. Through consumption and ground disturbance,

grazing by livestock and wild horses can affect surface water resources. These present mining related actions are surface mining operations that affect surface water resources by the pumping of ground water and associated indirect effects on spring and stream flows.

RFFAs - The RFFAs that have the potential to affect surface water resources are also grazing and mining-related actions. Through consumption and ground disturbance, grazing by livestock and wild horses can affect surface water resources. These RFFA mining-related actions would likely be surface mining operations that affect surface water resources by the pumping of ground water and associated indirect effects on spring and stream flows.

Cumulative activities indirectly affecting the surface water resources through the pumping of ground water was evaluated with ground water modeling of the cumulative actions that were modeled through the year 2055 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario. This analysis identifies a number of springs on the western flank of the Diamond Mountains, the northern end of Diamond Valley, in the Roberts Mountains and in Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to surface water resources from the Proposed Action and RFFAs for ground water development would be significant. The Proposed Action portion of the cumulative impacts is also considered significant and specific mitigation measures for the Proposed Action effect are identified in Section 3.2.3.3. The cumulative actions, exclusive of the Proposed Action, particularly the agricultural actions in Diamond Valley also have a significant effect on the surface water resources in Diamond Valley. No mitigation measures are proposed for the effects of this agricultural activity because the BLM does not have any regulatory authority over those actions.

4.4.1.2 Ground Water Quantity

Past Actions - The past actions that had the potential to affect ground water resources were principally agriculture related ground water pumping in Diamond Valley, which commenced in the late 1950s. Other past actions that affect ground water included domestic production in the Town of Eureka and the surrounding area ranches in Diamond Valley, Kobeh Valley, and Pine Valley, ground water pumping for livestock use, and mineral production in the Eureka Mining District and at Mount Hope.

Present Actions - The present and Proposed Actions that would potentially affect ground water resources are the continued pumping for agriculture and domestic uses in Diamond Valley, Kobeh Valley, and Pine Valley, as well as mining-related actions in the Eureka Mining District. Ground water pumping for livestock use, wild horse use, and wildlife use is another set of present actions affecting ground water resources.

RFFAs - The RFFAs that have the potential to affect ground water resources are also agricultural, domestic use, livestock use, wild horse use, wildlife use, and mining-related actions. These RFFAs would likely continue to pump ground water from Diamond Valley, Kobeh Valley, and Pine Valley. For the analysis in this portion of the EIS it is assumed that the present actions would continue pumping at the authorized rates under the RFFA scenario.

Ground water modeling of the cumulative activities affecting the ground water resources was conducted through year 2055 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario. This analysis identifies a number of wells in Diamond Valley and Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to ground water resources from the Proposed Action and RFFAs for ground water development would be significant. The Proposed Action portion of the cumulative impacts is also considered significant and specific mitigation measures for the Proposed Action effects are identified in Section 3.2.3.3. The cumulative actions, exclusive of the Proposed Action, particularly the agricultural actions in Diamond Valley also have a significant effect on the ground water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

4.4.2 Water Resources - Water Quality

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quality perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow model and pit lake chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan.

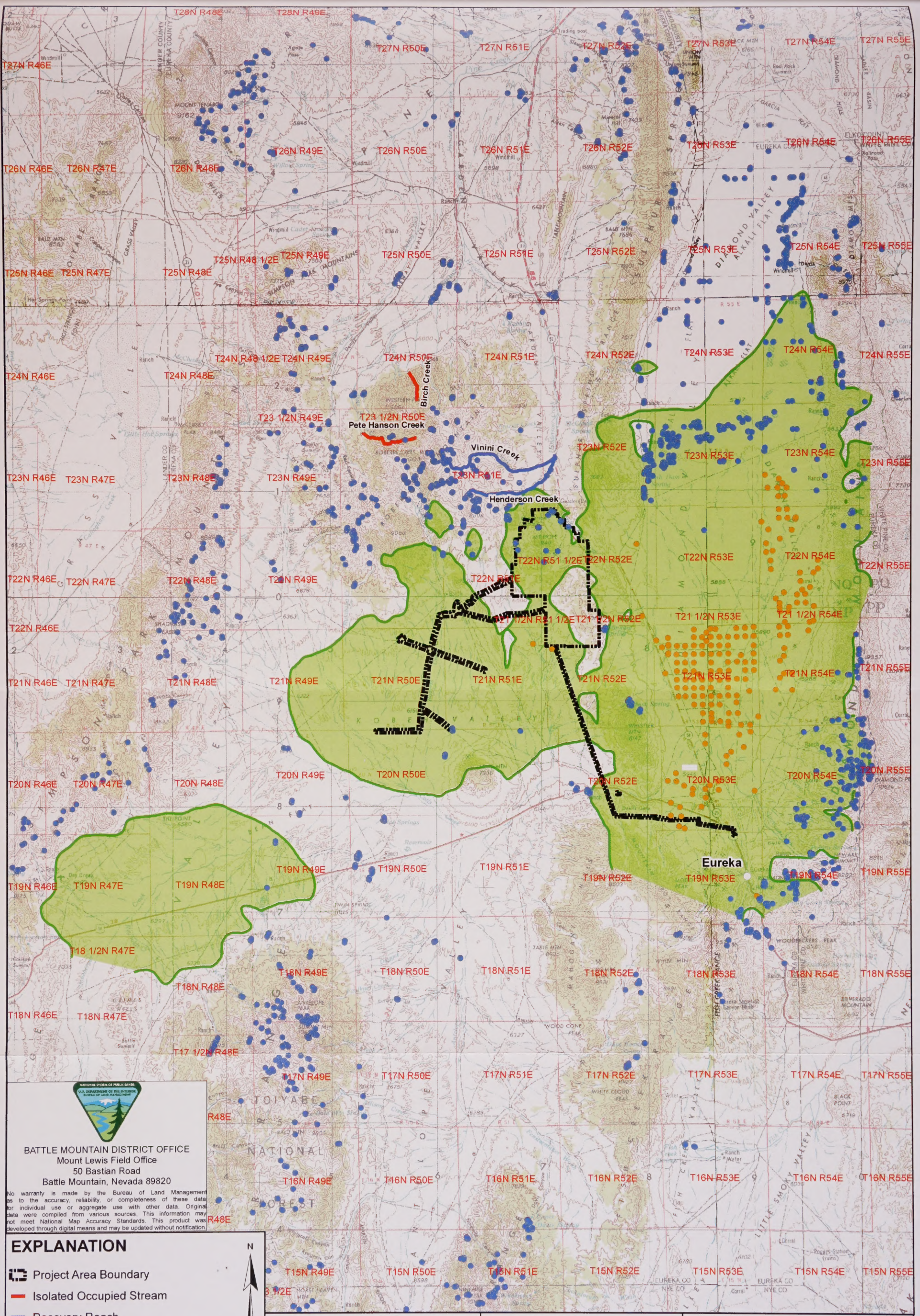
4.4.2.1 Surface Water Quality

Past Actions - The past actions that have affected surface water resources are primarily mining, ranching, wild horse actions, and agricultural operations. Past mining operations were of a smaller scale and consisted of underground operations with limited surface disturbance.

Present Actions - The present and Proposed Actions that would potentially affect surface water resources are wild horse use, grazing and mining-related actions, as well as dispersed recreation. These present mining related actions are surface mining operations that affect surface water resources by excavating, modifying, or covering existing topographic and geomorphic features and by changing surface erosion characteristics. The present grazing and dispersed recreation actions affect surface water resources by removing vegetation and decreasing bank stability near streams and springs.

RFFAs - The RFFAs that have the potential to affect surface water resources are also wild horse use, grazing, and mining-related actions. These RFFA mining-related actions would likely be surface mining operations that affect surface water resources by excavating, modifying, or covering existing topographic and geomorphic features and by changes to surface erosion characteristics. The RFFA grazing actions affect surface water resources by removing vegetation and decreasing bank stability near springs and streams.

The past, present, and RFFAs would potentially directly affect surface water resources through increased erosion and sedimentation. The mining-related cumulative actions would be required to implement erosion control measures that would limit their contribution to the cumulative impacts. Grazing has its own set of requirements that minimizes effects to surface water quality. Dispersed recreation actions would not have the same requirements and thus would have a



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Cumulative Action Scenario - Projected Water Table Drawdown at Project Year 44, End of Year 2055, Relative to Pre-Development (1955) Conditions

Figure 4.4.1

proportionally greater affect on surface water resources by removing vegetation and decreasing bank stability near streams and springs.

4.4.2.2 Ground Water Quality

Past Actions - The past actions that had the potential to affect ground water quality were principally mining operations in the Eureka Mining District and at Mount Hope as well as agriculture related operations in Diamond Valley, which commenced in the late 1950s. Other past actions that affect ground water quality included activities associated with the Town of Eureka and the surrounding area ranches in Diamond Valley, Kobeh Valley, and Pine Valley. All these activities had the potential to discharge chemicals or materials that could migrate into the ground water and decrease ground water quality.

Present Actions - The present and Proposed Actions that would potentially affect ground water resources are the continued agriculture and domestic related activities in Diamond Valley, Kobeh Valley and Pine Valley, as well as mining-related actions in the Eureka Mining District. All these activities had the potential to discharge chemicals or materials that could migrate into the ground water and decrease ground water quality. In addition, the Ruby Hill Mine, which is located in the southern portion of Diamond Valley would create a pit lake at the end of mining.

The potential affects to ground water quality from this pit lake are discussed in the Ruby Hill Mine Expansion - East Archimedes Project Final Supplemental EIS (BLM 2005), which is incorporated herein by reference. The pit lake would be a terminal lake and act as a ground water sink.

RFFAs - The RFFAs that have the potential to affect ground water resources are the continued agriculture and domestic related activities in Diamond Valley, Kobeh Valley, and Pine Valley, as well as mining-related actions in the Eureka Mining District. All these activities would have the potential to discharge chemicals or materials that could migrate into the ground water and decrease ground water quality.

Any potential cumulative impacts to ground water quality from the Proposed Action, along with the past and present actions and the RFFAs for ground water would not be significant, based on the criteria above. The only two actions that have a quantitative assessment of potential ground water quality impacts are the Proposed Action and the Ruby Hill Mine. Both of these actions have ground water quality impacts that are not significant based on the analyses in this EIS and in BLM (2005).

4.4.3 Geology and Mineral Resources

Past Actions - The past actions that had the potential to affect geology and mineral resources were mining-related actions. Most past mining operations were of a smaller scale and consisted of underground operations with limited surface disturbance. Most geology and mineral impacts resulted from a limited amount of mineral resource development activities, except for those activities in the vicinity of Eureka, which are outlined in Section 3.4.2. Historically, this area has been mined for Au, Ag, Pb, Cu, and Zn.

Present Actions - The present and Proposed Actions that would potentially affect geology and mineral resources are mining-related actions. These present mining related actions are surface mining operations that affect geology and mineral resources by excavating, modifying, or covering existing topographic and geomorphic features and by removing mineral resources.

RFFAs - The RFFAs that have the potential to affect geology and mineral resources are also mining-related actions. These RFFA mining-related actions would likely be surface mining operations that affect geology and mineral resources by excavating, modifying, or covering existing topographic and geomorphic features and by removing mineral resources.

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past **and** present disturbance is **approximately 4,917** acres, **with** approximately 1,727 acres of disturbance anticipated under the RFFAs. This totals **6,644** acres of disturbance within the 1,809,522-acre CESA, which is **approximately 0.4** percent of the area.

Mining is a major activity in the area, and it is likely that exploration activities and mining would continue. Additional impacts would result from the creation in the foreseeable future of additional open pit mining operations with WRDFs and processing facilities. The direct impacts affecting geology and mineral resources of the Proposed Action due to the open pit mining would be the permanent removal of the identified mineral resources. The cumulative impacts to geology and mineral resources from the Proposed Action and RFFAs for mineral development would not be significant. No mitigation is proposed.

4.4.4 Air Resources

Past Actions - Prior to the implementation of the CAA, few if any measures to control or minimize impacts to air quality were required. Most mining operations were of smaller scale and consisted of underground operations with small disturbance footprints. Most air quality impacts from these operations consisted of the generation of fugitive dust during exploration road building, trenching, and mining operations, as well as agricultural operations and travel on dirt roads. An exception to this was the mineral processing operation in the Eureka area, which included furnaces that were fueled with locally produced charcoal. Air quality impacts from these operations were substantial, consisting of heavy particulates and metal emissions. In addition, the locally produced charcoal was generated by burning (baking) cut and stacked piñon and juniper trees, which generated particulate and VOC emissions. Another action that affects Air Resources is wildland fires, which contribute substantial amounts of particulates.

Present Actions - All the present emissions, including the Proposed Action, are located within the Diamond Valley, Kobeh Valley, and Pine Valley air basins. Impacts to air quality from mining-related activities would include the generation of fugitive dust from blasting, exploration drilling, road building, haul truck operations, and mining operations. Other air emissions would be generated from processing facilities and the burning of fossil fuels by heavy equipment and other vehicles, travel on dirt roads, recreation, and wildland fires. Agricultural operations and commercial operations also generate fugitive dust and combustion emissions.

RFFAs - Air quality impacts from RFFAs could include generation of fugitive dust during hard rock exploration, mineral development, and the development of oil and gas or geothermal operations. Emissions may also be generated from processing facilities, burning of fossil fuels by heavy equipment and other vehicles, vehicle travel on paved and unpaved roads, fugitive dust from travel on unpaved roads, and wildland fires. Some of these emissions would be localized and subject to BAPC air quality permits and compliance, development of mitigation measures, and implementation of **applicant committed practices**. Others would be more long term and basin wide.

Each of the identified individual projects within the CESA, including existing and proposed mining operations, emit air pollutants. With the possible exception of motor vehicle emissions, the existing and proposed mining operations are the major sources of criteria pollutants within the CESA. The modeling for the Proposed Action, as well as the Ruby Hill Mine **(Homestake Mining Company, Ruby Hill Project, Air Operating Permit Number AP1041-0713.03, Issued January 28, 2012)**, shows that the levels of these pollutants are below the applicable standards. The Proposed Action would not result in a significant cumulative impact to air resources. The RFFAs would result in additional emissions similar to those currently emitted by the existing operations within the CESA. In addition, the major sources of pollutants (except for motor vehicle emissions) within the CESA would operate under permit conditions established by the BAPC and therefore would not be significant.

4.4.5 Visual Resources

Past Actions - The past actions that had the potential to affect visual resources were mining-related actions. The past mining operations were of a small (Mount Hope underground) to moderate (Gold Bar Mine and Eureka Mining District) scale and consisted of underground and surface operations with limited to substantial surface disturbance. Other past actions include roads, powerlines, and buildings. Most visual resource impacts resulted from surface disturbance associated with the actions and the structures created by the actions.

Present Actions - The present and proposed actions that had the potential to affect visual resources are mining-related, agriculture related, and general development actions. The present mining operations include the Ruby Hill Mine, which is a surface operation with substantial surface disturbance. Most visual resource impacts resulted from surface disturbance associated with the actions and the structures created by the actions.

RFFAs - The RFFAs that had the potential to affect visual resources would be a continuation to the present mining-related, agriculture-related, utilities and infrastructure, and general development actions. Most visual resource impacts resulted from surface disturbance associated with the actions and the structures created by the actions.

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **approximately 2,681** acres, and approximately 1,**439** acres of disturbance is anticipated under the RFFAs. Past and present actions, as well as RFFAs associated with agricultural actions have surface disturbance totaling approximately 29,496 acres. Past and present actions, as well as RFFAs associated with utilities and infrastructure actions have surface disturbance totaling

approximately 51,823 acres. Past and present actions, as well as RFFAs associated with general development actions have surface disturbance totaling approximately 16,074 acres. These actions total approximately **101,713** acres of disturbance within the approximately 645,000-acre CESA for visual resources.

There are many actions that have an effect on the visual resources within the vicinity of the Project Area. The BLM's visual management for the Project Area allows for substantial change to the visual characteristics of the area. In addition, VRM classes do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities. Therefore, the cumulative impacts to visual resources from the Proposed Action, along with the past and present actions and the RFFAs would not be significant; however, activities to minimize the visual effects are incorporated in the Project reclamation plan **and mitigation identified in Section 3.7.3**.

4.4.6 Soils

Past Actions - Past or historic mining operations within the **CESA** include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The disturbance to vegetation is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area include the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance to vegetation. The Gold Bar Mine operated between the 1980s and 1990s and only a portion of the operation was reclaimed, which included the redistribution of stockpiled growth media and reestablishment of soil resources and vegetation. The Ruby Hill Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soil resources. Other past actions that have affected soils resources include the development of roads, powerlines and other utilities, dispersed recreation, fences, development of cattle and wild horse water sources, agricultural activities, and land development and are estimated at 550 acres of surface disturbance that affect soil resources. Impacts to soil resources from these activities include burial, compaction, mixing, and erosion. The extent of these impacts varies with the type of activity.

Present Actions - Present actions include the ongoing Ruby Hill Mine, discussed above, as well as exploration activities under **28** notices**, one** plan of operations**, and two sand and gravel operations**. These are estimated at **938** acres that are not otherwise included under the past actions. The Proposed Action would include 8,3**55** acres of surface disturbance to soil resources. Other present actions that have an effect to soil resources are a continuation of those activities outlined under past actions. Impacts to soil resources from these activities include burial, compaction, mixing, and erosion. The extent of these impacts varies with the type of activity.

RFFAs - RFFAs within the **CESA** could result in up to approximately **6,934** acres of surface disturbance that would affect soil resources. These activities include up to 1,**55**7 acres of surface disturbance associated with mineral operations and 5,377 acres associated with land sales and their subsequent development. Impacts to soils resources from these activities include burial, compaction, mixing, and erosion. The extent of these impacts varies with the type of activity.

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect soil resources. **Most of t**he past actions are not subject to any reclamation activities **because they pre-date federal and state reclamation requirements**. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for soil resources covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the soil resources within the CESA.

4.4.7 Vegetation Resources

Past Actions - Past or historic mining operations within the study area include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The disturbance to vegetation is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area including the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance to vegetation. The Gold Bar Mine operated between the 1980s and 1990s and only a portion of the operation was reclaimed, which included the redistribution of stockpiled growth media and reestablishment of soil resources and vegetation. The Ruby Hill Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soil resources. Other past actions that have affected vegetation include the development of roads, powerlines and other utilities, fences, development of cattle and wild horse water sources, livestock grazing, wild horse use, agricultural activities (both direct vegetation changes and changes to phreatophytic vegetation from water table drawdown), dispersed recreation, and land development and are estimated at 550 acres of surface disturbance. Impacts to vegetation from these activities include removal of vegetation, compaction, mixing, erosion of soils, and change in plant community structure and diversity. The extent of these impacts varies with the type of activity. The Bootstraps crew treated approximately 2,500 acres of piñon-juniper in the Willow and Vinini Creek drainages and in the Henderson Summit area in 2008 and 2009 under the Roberts Mountain Wildlife Habitat Enhancement Project EA completed in 2007.

Present Actions - Present actions include the ongoing Ruby Hill Mine, discussed above, as well as exploration activities under **28** notices**, one** plan of operations, **and two sand and gravel operations** which are estimated at **938** acres that are not otherwise included under the past actions. The Proposed Action would include 8,3**55** acres of surface disturbance to vegetation, as well as potential changes to phreatophytic vegetation and habitat for the Monte Neva Indian paintbrush from the water table drawdown. The Sulphur Springs Hazardous Fuels Reduction EA was completed in 2009 has been partially implemented. The EA allows for the removal/thinning of encroaching piñon-juniper from up to 3,000 acres of habitat containing healthy concentrations of bitterbrush. That part of the project has not yet been implemented. The BLM intends to initiate this project in 2011 with the Bootstraps crew, though most of the BLM's efforts would be focused on continuation of the Bald Mountain project initiated in 2010, if expected NRCS funding is approved. Other present actions that have an effect on vegetation are a continuation of those activities outlined under past actions. Impacts to vegetation from these activities include

removal of vegetation and compaction, mixing, erosion of soils, and change in plant community structure and diversity. The extent of these impacts varies with the type of activity.

RFFAs - RFFAs within the **CESA** could result in up to approximately **6,934** acres of surface disturbance that would affect vegetation. These activities include up to 1,**557** acres of surface disturbance associated with mineral operations and 5,377 acres associated with land sales and their subsequent development. Impacts to vegetation from these activities include removal of vegetation and compaction, mixing, erosion of soils, and change in plant community structure and diversity. The extent of these impacts varies with the type of activity.

Total past actions, present actions, and RFFAs would result in up to approximately **23,820** acres of surface disturbance that would affect vegetation. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other non-habitat restoration present actions and RFFAs (which total approximately 85,900 acres) would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for vegetation covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **42** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Proposed Action represents less than **four** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

The four special status plant species with potential habitat within the Project Area (Beatley buckwheat, least phacelia, Monte Neva Indian paintbrush, and windloving buckwheat) also have potential habitat within the CESA. None of these species has been documented as occurring within the CESA; however, no systematic survey has been completed. The cumulative effect and incremental loss of potential habitat for the four special status plant species resulting from past and present actions, proposed actions, and RFFAs would be below the level of significance.

4.4.8 Noxious Weeds, Invasive and Nonnative Species

Past Actions - Past or historic mining operations within the study area include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. Surface disturbance creates an environment conducive to supporting noxious weeds and invasive, nonnative species. The disturbance to vegetation and potential impacts from noxious weeds and invasive, nonnative species is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area include the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance to vegetation and potential impacts from invasive, nonnative species and noxious weeds. The Gold Bar Mine operated between the 1980s and 1990s, and only a portion of the operation was reclaimed, which included the redistribution of stockpile growth media and the reestablishment of soil resources; however, approximately 11 acres of the old Ruby Hill mill site are currently infested with spotted knapweed, a NDOA Category A noxious weed. The Ruby Hill

Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soil resources. Other past actions that have resulted in the removal of vegetation include the development of roads, powerlines and other utilities, fences, development of cattle and wild horse water sources, agricultural activities, dispersed recreation, noxious weed control efforts, and land development and are estimated at 550 acres of surface disturbance. Impacts from these activities include the increased potential to introduce noxious weeds and invasive, nonnative species or spread existing populations of noxious weeds and invasive, nonnative species. The extent of these impacts varies with the type of activity.

Present Actions - Present actions include the ongoing Ruby Hill Mine, discussed above, as well as exploration activities under **28** notices, **one** plan of operations, **and two sand and gravel operations** which are estimated at **938** acres that are not otherwise included under the past actions. The Proposed Action would include 8,**355** acres of surface disturbance to vegetation and noxious weeds and invasive, nonnative species. Other present actions that have an effect on vegetation and noxious weeds and invasive, nonnative species are a continuation of those activities outlined under past actions. Impacts from these activities include the increased potential to introduce noxious weeds and invasive, nonnative species or spread existing populations of noxious weeds and invasive, nonnative species. The extent of these impacts varies with the type of activity.

RFFAs - RFFAs within the **CESA** could result in up to approximately **6,934** acres of surface disturbance that would affect vegetation. These activities include up to 1,**557** acres of surface disturbance associated with mineral operations and 5,377 acres associated with land sales and their subsequent development. Impacts from these activities include the increased potential to introduce noxious weeds and invasive, nonnative species or spread existing populations of noxious weeds and invasive, nonnative species. The extent of these impacts vary with the type of activity.

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation, noxious weeds, and invasive, nonnative species. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for noxious weeds and invasive, nonnative species covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Proposed Action represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs.

An infestation of noxious weeds and invasive, nonnative species that starts in one project may expand to outside areas and increase the chance of the introduction of noxious weeds and invasive, nonnative species to other disturbed locations. The **applicant committed practices** identified to reduce the potential impacts of the Proposed Action would help to control noxious weed establishment and spread within and adjacent to the Project Area; therefore, the cumulative

and incremental effect of surface disturbance on noxious weed management would be below the level of significance.

4.4.9 Wetlands and Riparian Zones

Past Actions - Past or historic mining operations within the study area include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The disturbance to vegetation is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area include the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance to vegetation. The Gold Bar Mine operated between the 1980s and 1990s, and only a portion of the operation was reclaimed, which included the redistribution of stockpiled growth media and reestablishment of soil resources and vegetation. The Ruby Hill Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soil resources. Other past actions that have affected vegetation and wetlands and riparian zones include the development of roads, powerlines and other utilities, fences, development of cattle and wild horse water sources, livestock and wild horse use of water sources, agricultural activities (both direct disturbance of vegetation and indirect effects due to ground water pumping), dispersed recreation, and land development and are estimated at 550 acres of surface disturbance. Impacts to wetlands would likely be substantially less than this because most of the disturbance was removed from the drainage where the wetland and riparian vegetation communities occur. Specific impacts to wetlands and riparian zones from these activities included the diversion of flows for mining or agriculture, the pumping of ground water that is the source for streams and springs, the filling of drainages with spoil material, the removal of vegetation, or water drawdown resulting from dewatering activities. The extent of these impacts varies with the type of activity, as well as the location and proximity to the wetland and riparian communities.

Present Actions - Present actions include the ongoing Ruby Hill Mine, discussed above, as well as exploration activities under **28** notices**, one** plan of operations, **and two sand and gravel operations** which are estimated at **938** acres that are not otherwise included under the past actions. The Proposed Action would include 8,**355** acres of surface disturbance to vegetation and potential indirect effects to riparian and wetland vegetation. Other present actions that have an effect on wetlands and riparian zones are a continuation of those activities outlined under past actions. Impacts to wetlands would likely be substantially less than this because most of the disturbance was removed from the drainage where the wetland and riparian vegetation communities occur. Specific impacts to wetlands and riparian zones from these activities included the diversion of flows for mining or agriculture, the pumping of ground water that is the source for streams and springs, the filling of drainages with spoil material, the removal of vegetation, or water drawdown resulting from dewatering activities. The extent of these impacts varies with the type of activity. As discussed in Section 3.2, the water table drawdown resulting from the Proposed Action's mine dewatering system and ground water production systems is not expected to have a significant effect on riparian vegetation within the CESA.

RFFAs - RFFAs within the **CESA** could result in up to approximately **6,934** acres of surface disturbance that would affect vegetation, which could affect wetland and riparian areas. These

activities include up to 1,557 acres of surface disturbance associated with mineral operations and 5,377 acres associated with land sales and their subsequent development that could affect wetland and riparian areas. Impacts to wetlands would likely be substantially less than this because most of the disturbance was removed from the drainage where the wetland and riparian vegetation communities occur. Specific impacts to wetlands and riparian zones from these activities included the diversion of flows for mining or agriculture, the pumping of ground water that is the source for streams and springs, the filling of drainages with spoil material, the removal of vegetation, or water drawdown resulting from dewatering activities. The extent of these impacts varies with the type of activity.

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation; however, this disturbance is likely to occur in vegetation communities other than the wetland and riparian communities. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for wetlands and riparian zones covers approximately 262,490 acres; therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA, which includes an indirect effect to approximately four acres of riparian vegetation community. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Proposed Action represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The cumulative and incremental effect to wetlands and riparian zones would be significant. Mitigation for the Proposed Action is outlined in Section 3.11.3.3.

4.4.10 Livestock Grazing and Production

Past Actions - Past or historic mining operations within the study area include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The disturbance to livestock grazing and production is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area include the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance to livestock grazing and production. The Gold Bar Mine operated between the 1980s and 1990s, and only a portion of the operation has been reclaimed, which included the redistribution of stockpiled growth media and reestablishment of soil resources and vegetation. The Ruby Hill Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soils. Other past actions that have affected livestock grazing and production include the development of roads, powerlines and other utilities, fences, development of cattle and wild horse water sources, agricultural activities, and land development and are estimated at 550 acres of surface disturbance. Impacts to livestock grazing and production from these activities include removal of vegetation (i.e., forage and cover for livestock) and compaction, mixing, erosion of soils, and change in plant community structure and diversity. The extent of these impacts varies with the type of activity.

Present Actions - Present actions within the CESA with the potential to impact livestock grazing and production include the following activities: irrigation of crops, which is estimated to occur on approximately 28,**736** acres; habitat stabilization and rehabilitation activities on approximately **3,226** acres; wildland fires, fuels management, and reseeding projects on approximately 2,**087** acres; minerals activities on approximately **1,176** acres; and the Proposed Action, which would include 8,**355** acres of surface disturbance to livestock grazing and production and fencing that would enclose 14,204 acres, eliminating approximately 781 AUMs. Wild horse management affects livestock grazing and production as a result of gathers and adjustments to AMLs. Wild horse management can also affect the composition and productivity of the forage. Impacts to livestock grazing and production from these activities include removal of vegetation (i.e., forage and cover for livestock) and compaction, mixing, erosion of soils, and change in plant community structure and diversity. The extent of these impacts varies with the type of activity.

RFFAs - RFFAs within the CESA with the potential to impact livestock grazing and production include the following activities: wildland fires, fuels management, and reseeding projects on approximately **522,500** acres; habitat stabilization and rehabilitation activities on approximately **44,094** acres; minerals activities on approximately **1,440** acres; and **5,857** acres associated with land sales and their subsequent development. Impacts to livestock grazing and production from these activities include removal of vegetation (i.e., forage and cover for livestock) and compaction, mixing, erosion of soils, and change in plant community structure and diversity. The extent of these impacts varies with the type of activity. Other actions that could either positively or negatively affect livestock grazing and production include the 3 Bars Landscape Restoration Project, wild horse management activities, recreational uses, dewatering activities associated with mining operations, ground water pumping associated with agricultural operations, and livestock uses.

Total past actions, present actions, and RFFAs would result in up to approximately **619,054** acres of surface disturbance in the CESA; however, approximately **40,094** acres of surface disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements, which would result in positive impacts to livestock grazing and production in the CESA. The majority of the **619,054** acres would be reclaimed and available for livestock grazing after the completion of reclamation activities. Approximately 781 AUMs would be lost in the Project Area due to the exclosure as a result of the Project, which is six percent of the current active grazing preference.

4.4.11 Wild Horses

Past Actions - Mining activity, oil and gas production, geothermal development, gravel pit expansion, road building, fencing, wild horse gathers, OHV use, and wind generation are all activities, which can impact wild horse distribution and seasonal movement throughout and between HMAs. Impacts to wild horses from these activities include removal of vegetation (1,348 acres) and forage, increased traffic, and displacement or disturbance from loud and sudden noises. Additional impacts to wild horses from these activities include changes in use and distribution patterns within HMAs. The extent of these impacts varies with the type of activity. Each activity results in incremental restrictions on free roaming behavior and over time may influence utilization patterns, genetic interchange, and use of water sources. Fences which exclude wild horse use may be constructed to protect riparian areas from overuse, exclude study

areas or seedings, or divide grazing allotments or pastures. These fences result in fragmentation of the HMA and habitat used by wild horses, and restricts use of the HMAs.

Present Actions - Present actions would include 14,204 acres of surface disturbance that would affect wild horses **within the fenced boundary**. Other present actions that have an effect on vegetation are a continuation of those other activities outlined under past actions. Impacts to wild horses from these activities include removal of vegetation and forage, increased traffic, and displacement or disturbance from loud and sudden noises. The extent of these impacts varies with the type of activity.

RFFAs - RFFAs within the **CESA** could result in minerals activities on approximately **1,556** acres and 950 acres associated with land sales and their subsequent development. Impacts to wild horses from these activities include removal of vegetation and forage, increased traffic, and displacement or disturbance from loud and sudden noises. The extent of these impacts varies with the type of activity. Other actions that could either positively or negatively affect wild horses include the 3 Bars Landscape Restoration Project, wild horse management activities, recreational uses, dewatering activities associated with mining operations, ground water pumping associated with agricultural operations, and livestock uses.

Total past actions, present actions, and RFFAs would result in up to approximately **18,058** acres of surface disturbance that would affect wild horses **within the CESA**. The majority of this disturbance is associated with mining operations and is subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not likely be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for wild horses covers approximately 253,610 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Proposed Action represents less than five percent of the total surface disturbance resulting from past, present, and RFFAs. In addition, the Proposed Action may result in further fragmentation of the habitat used within these HMAs through construction of over 20 miles of pipeline, construction of additional powerline, additional access road and fences. The implementation of mitigation measures identified in Chapter 3 of this EIS limit the loss of habitat and water sources to wild horses in the Project Area by development of six water sources; therefore, the cumulative and incremental effects to wild horses would be below the level of significance.

4.4.12 Land Use

Past Actions - Past actions generally did not consider potential impacts to land use and access, unless those actions had an effect on private property, or rights granted by the federal government. However, past actions such as powerlines, fences, unpaved roads, SR 278, and the past mining operations at Mount Hope have had and continue to have some level of location-specific impact on land use and access.

Present Actions - The present actions are similar to the past actions and in most cases are continuations of the past actions. These actions also have a continuing location-specific effect on

land use and access. The Proposed Action would restrict land use and access through and within the Project Area.

RFFAs - Land use impacts from RFFAs could include limited or restricted use or access through specific areas from mineral exploration, mining, or fencing. These impacts would tend to be localized near the activities.

The current uses of the public lands within the Project Area are similar to those within the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, land use and access through that portion of the Project Area would be substantially changed.

4.4.13 Recreation and Wilderness Study Areas

Past Actions - Past or historic mining operations within the **CESA** include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The disturbance is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area include the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance. The Gold Bar Mine operated between the 1980s and 1990s, and only a portion of the operation was reclaimed, which included the redistribution of stockpiled growth media and reestablishment of soil resources and vegetation. The Ruby Hill Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soil resources. Other past actions that have affected recreation and wilderness include the development of roads, wildland fires and fuels management, powerlines and other utilities, fences, development of cattle and wild horse water sources, agricultural activities, and land development. The cumulative disturbance associated with these activities is estimated at **391,065** acres. Impacts to recreation and wilderness from these activities include restrictions on access, noise, alterations to the visual characteristics, loss or displacement of wildlife, and impacts to surface waters and fishing. The extent of these impacts vary with the type of activity. In addition, this disturbance and associated effects on the recreational characteristics and wilderness values was likely minimal due to the different social values of the times.

Present Actions - Present actions include the ongoing Ruby Hill Mine, discussed above, as well as exploration activities under **86** notices**, three** plans of operations**, and 39 sand and gravel operations**. These are estimated at **2,888** acres that are not otherwise included under the past actions. The Proposed Action would include 8,**355** acres of surface disturbance. The Proposed Action would restrict access to 14,204 acres in the Project Area for the duration of the Project (approximately 70 years) and 734 acres in the long term. Other present actions that have an effect on recreation and wilderness are a continuation of the activities outlined under past actions. Impacts to recreation and wilderness from these activities include restrictions on access, noise, alterations to the visual characteristics, loss or displacement of wildlife, and impacts to surface waters and fishing; all of which diminishes the overall quality of the recreational or wilderness experience. The extent of these impacts varies with the type of activity.

RFFAs - RFFAs within the **CESA** could result in up to approximately **574,243** acres of surface disturbance that would affect recreation and wilderness. These activities include up to 44,094 acres of disturbance associated with habitat stabilization and rehabilitation, **522,500** acres associated with wildland fires, fuels management, and reseeding, **1,792** acres of surface disturbance associated with mineral operations, and 5,857 acres associated with land sales and their subsequent development. Impacts to recreation and wilderness from these activities include restrictions on access, noise, alterations to the visual characteristics, loss or displacement of wildlife, and impacts to surface waters and fishing; all of which diminishes the overall quality of the recreational or wilderness experience. The extent of these impacts varies with the type of activity.

Total past actions, present actions, and RFFAs would result in up to approximately **993,032** acres of surface disturbance that would affect recreation, as well as potential indirect effects to high use recreation locations associated with the Roberts Creek drainage. The CESA for recreation and wilderness covers approximately 1,970,179 acres; therefore, approximately **50** percent of the CESA would be impacted. The Roberts Mountain and Simpson Park WSAs are located within the CESA for recreation and wilderness. The only past action, present action, or RFFA that could be expected to effect the WSAs are wildland fires and livestock grazing and production. All other actions could not reasonably be expected to occur within the WSA. The present actions and RFFAs associated with mineral operations and other activities on BLM-administered lands are subject to reclamation requirements, which would restore areas for future use and minimize the long-term impacts. In addition, approximately 44,094 acres of surface disturbance is, or would be, associated with habitat stabilization and rehabilitation, which would result in positive impacts to recreation and wilderness in the CESA; therefore the quality of the area available for future recreational opportunities would be improved, and there would be, in the long term, no unmitigated loss of a unique recreational resource. During the time any one, or all, of the activities is occurring there would be a reduction in the quality of the recreational or wilderness experience in portions of the CESA.

It is not known which activities, other than the Proposed Action, may result in restrictions to access of recreation areas, but very few restrictions are anticipated. The permanent access restriction as a result of the Proposed Action would account for only 0.4 percent of the CESA; therefore, the cumulative and incremental effect of the permanent access restriction from public lands managed for multiple uses within the CESA would be below the level of significance.

4.4.14 Auditory Resources

Past Actions - Past actions generally did not consider potential impacts to auditory resources; however, any potential impacts from past actions would not persist, since any impacts would have been short term in nature and would not carry forward to the present.

Present Actions - The present actions within the CESA, including the Proposed Action are outlined in Section 3.16.2.2 and include Proposed Action activities, ranching, and traffic on SR 278.

RFFAs - Auditory resource impacts from RFFAs could include noise generation from mineral exploration and traffic on paved and unpaved roads. These impacts would tend to be localized near their noise sources.

Each of the identified individual projects within the CESA, including the proposed mining operations, contributes noise to the natural environment. Since the Proposed Action is the principal and dominant noise generating activity within the CESA, the potential impacts are less than significant (Section 3.16.3.3), and any present actions and RFFAs would be dispersed throughout the CESA, none of the projects including the Proposed Action would result in a significant cumulative impact to the auditory resources.

4.4.15 Socioeconomic Values

Past Actions - Past or historic mining operations within the study area include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The more recent operations within the study area include the Gold Bar Mine and the Ruby Hill Mine. The Gold Bar Mine operated between the 1980s and 1990s and the Ruby Hill Mine began operations in the 1990s and is currently in operation. Other past actions that have affected socioeconomic values include the development of powerlines and other utilities, agricultural activities, recreation, and land development. Impacts to socioeconomic values from these activities include increased population, increased demand for public services, increased expenditures by Eureka County, increased employment opportunities, and increased revenues for Eureka County. The extent of these impacts vary with the type of activity and have not been quantified, however, the majority of the impacts from past activities do not have any ongoing impacts and are considered to be part of the existing social and economic climate.

Present Actions - The present actions that would impact socioeconomic values include the following: mineral development and exploration; grazing and agriculture; recreation; oil, gas, and geothermal development; and land development. Impacts to socioeconomic values from these activities include increased population, increased demand for public services, increased expenditures by Eureka County, increased employment opportunities, and increased revenues for Eureka County. The extent of these impacts varies with the type of activity and have not been quantified. As discussed in Section 3.17, the Proposed Action would result in significant impacts by inducing substantial growth, causing a substantial net increase in county expenditures, and creating a substantial demand for public services and housing. In addition, county revenues, in the form of tax and net proceeds receipts, would have a corresponding increase.

RFFAs - Socioeconomic values impacts would result from the following RFFAs: mineral development and exploration; recreation; land development (including land sales); grazing and agriculture; and oil, gas, and geothermal development. The extent of the impacts from these actions would depend on the type and size of the project. Specific projects that are planned include BLM land sales and the ensuing development of the lands, mineral development and exploration, and oil and gas leasing and development. **Additionally, the BLM has received Plans of Operations and is preparing EISs for the Bald Mountain Mine North and South Operations Area Projects and the Pan Mine Project, which have a potential effect on socioeconomics. The Bald Mountain Mine North and South Operations Area Projects propose to employ approximately 200 workers during construction. This number would decrease to approximately 100 employees during project operations. The Pan Mine Project proposes to employ approximately 160 workers during construction. This number would decrease to approximately 150 employees during project operations.** These actions would tend to increase the significant cumulative impact to socioeconomic values.

The identified projects within the CESA, including the Proposed Action, would have both beneficial and potentially adverse impacts on social and economic values in Eureka County. As stated in Section 3.17, EML has and would continue to coordinate with Eureka County to address these impacts and minimize the short-term fiscal impacts on the County.

4.4.16 Environmental Justice

Initial analysis concluded that the potential effects of the Project would not be expected to disproportionately affect any particular population. Environmental effects that may occur at a greater distance, such as auditory resource or air impacts, would affect the area's population equally, without regard to nationality or income level. Since no disproportionate effects on an identified minority population results from the Proposed Action or the RFFAs, no further environmental justice analyses are required.

4.4.17 Hazardous Materials

Past Actions - Past actions generally did not consider potential impacts from hazardous materials; however, any potential impacts from past actions would not persist, since any uses of hazardous materials would have been limited in scope based on the past uses in the CESA and would likely not carry forward to the present.

Present Actions - The present actions within the CESA are outlined in Section 3.19.2.2 and include mining activities, ranching, and truck traffic on SR 278.

RFFAs - Hazardous materials impacts from RFFAs could include spills and leaks from mineral exploration and traffic on paved and unpaved roads. These impacts would tend to be localized near their sources.

The present actions and RFFAs within the CESA, including the proposed mining operations, contribute to potential hazardous materials effects to the natural environment. Since the Proposed Action is the principal hazardous materials generating activity within the CESA, its potential impacts are less than significant (Section 3.19.3.3), and any existing action and RFFAs such as traffic on SR 278 would be dispersed throughout the CESA, there would be no significant cumulative hazardous materials impact.

4.4.18 Historic Trails

The Historic Trail CESA is the viewshed from the Pony Express Trail for a distance of approximately three miles away from the trail. This area encompasses approximately 69,061 acres (Figure 3.20.1).

Past Actions - Past actions did not consider potential effects on the historic trail, primarily because the historic trail designation had not been created; however, these past actions, such as powerlines, fences, unpaved roads, SR 278, and past mining operations at Mount Hope have had and continue to have impacts on the visual setting for the historic trail. In addition, past mining operations were not subject to reclamation laws. These impacts are significant.

Present Actions - The present actions are similar to the past actions, except for the Project mining operations, and in most cases are a continuation of the past actions. These actions also have a continuing effect on the visual setting for the historic trail. As outlined in Section 3.20, the Proposed Action has a significant effect on the historic trail.

RFFAs - Historic trail impacts from RFFAs could include visual effects from mineral exploration and traffic on paved and unpaved roads. These impacts would tend to increase the significant cumulative impact to the historic trail. Additionally, direct effects to the historic trail could occur from these RFFAs.

The identified projects within the CESA, including the Proposed Action have an impact on the visual setting for the historic trail by adding visual elements that detract from the experience of those using the trail. These impacts are significant; however, the Proposed Action has design features that have been developed to lessen the impact. In addition, there is no mitigation that could reduce the impact to less than significant. In addition, under the RFFA a majority of the Project Area is identified as Category 1 in the RMP for disposal. Therefore, a sale of a major portion of the Project Area is **possible** and access through that portion of the Project Area could be **affected**. **Site-specific analysis and public involvement would be required prior to any land disposal action and a more thorough examination of potential impacts to the Pony Express Trail would be done at that time. An assessment of those impacts would be a deciding factor in the consideration of any disposal action.**

4.4.19 Cultural Resources

The area of cumulative analysis for cultural resources was defined in the PA to be the area in a 20-mile radius of Mount Hope, which covers an area of approximately 200,960 acres (Figure 3.7.1).

Past Actions – Most past actions did not consider potential effects on cultural resources. Projects and development disturbances conducted prior to 1966 (i.e., prior to NHPA) or those activities without a federal or state nexus generally did not identify or quantify cultural resource sites or impacts to them. These past actions, such as powerlines, fences, unpaved roads, SR 278, and mining operations may have had a direct physical effect on cultural sites. These activities have had and continue to have impacts on the visual setting for cultural resources. These impacts are potentially significant.

Present Actions - The present actions are similar to the past actions, and in most cases is a continuation of the past actions. These actions also have a continuing effect on the visual setting for cultural resources.

RFFAs - Cultural resource impacts from RFFAs could include indirect visual effects from mineral exploration and traffic on paved and unpaved roads. These impacts would tend to increase the significant cumulative impact to cultural resources. Additionally, direct effects to cultural resources from these are RFFAs could occur.

The identified projects within the CESA, including the Proposed Action have a direct physical impact on the cultural resources and an indirect impact on the visual setting for specific cultural resources that are potentially significant. Within the cumulative effects viewshed APE, a total of

436 eligible and unevaluated historic (361) and multi-component (75) sites with a historic component would be impacted. This number includes 152 officially eligible historic sites and 39 officially eligible multi-component sites with a historic element within the Project APE (Table 3.21-1). Impacts to these sites would be mitigated through the implementation of a treatment plan. Outside of the Project APE and within the viewshed APE, an additional 245 eligible or unevaluated historic and historic component sites may be adversely impacted. All adverse effects under the NHPA and direct and indirect impacts under NEPA to known-eligible properties identified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. Therefore, no additional mitigation or monitoring is proposed. No residual adverse effects are anticipated, as all known-eligible sites would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA.

4.4.20 Native American Traditional Values

Past Actions - Many past actions did not always consider potential effects on Native American Traditional Values, primarily because the management or consideration of this issue was not required. However, these past actions, such as powerlines, fences, unpaved roads, SR 278, wildland fires, and mining operations have resulted in the removal of piñon trees. The primary areas of past piñon tree removal include mining in the southern Roberts Mountains, northern Simpson Park Range and in the vicinity of Cortez, as well as wildland fires in the Cortez Range Commercial pine nut harvesting limits the amount of pine nuts that are available for Native American gathering in any given year. In addition, there are a number of projects that have resulted in the retrieval of prehistoric artifacts from public lands.

Present Actions - The present actions are similar to the past actions, except for mining operations, and in most cases are a continuation of the past actions. Present mining within the Native American CESA is focused in two areas; the Carlin Trend and the Cortez-Pipeline area. As shown on Figure 4.4.2, these two areas have ongoing dewatering operations that have the potential to affect a number of springs and perennial streams through decreased flows. The present mining operations have had a limited effect on piñon trees (Figure 4.3.3). However, present mining operations have resulted in the retrieval of prehistoric artifacts from public and private lands.

RFFAs - Impacts to Native American Traditional Values from RFFAs could include the removal of additional piñon trees.

The identified projects within the CESA, including the Proposed Action have an impact on Native American Traditional Values, which include pine nut gathering and water resources. The Proposed Action would not result in the removal of any piñon-only woodlands. The Proposed Action's removal of piñon trees and limiting of access to other piñon trees in piñon-juniper woodlands within the fenced Project Area, relative to all other impacts to piñon trees, is not readily quantifiable. It is likely less than one percent of all the piñon trees within piñon-only and piñon-juniper woodlands within the CESA. In addition, the cumulative effect to piñon trees, relative to the total number of piñon trees within the Native American Traditional Values CESA is small (Figure 4.3.3) The Proposed Action's potential effect to water resources from ground

water pumping, as shown on Figure 4.4.2, is isolated from the ground water pumping associated with the other mining operations within the Native American Traditional Values CESA. Figure 4.4.2 also shows the location of projects within the CESA where the removal or retrieval of prehistoric artifacts have occurred or may have occurred. Figure 4.4.2 does not show any potential effects from ground water pumping associated with agricultural operations. The Proposed Action's potential effects to water resources is incrementally a small percent of the total potential effect to water resources from all ground water pumping operations.

4.4.21 Wildlife and Fisheries Resources

Past Actions - Past or historic mining operations within the **CESA** include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The disturbance to habitat for wildlife and fisheries resources is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area include the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance **resulted in impacts** to wildlife and fisheries resources. The Gold Bar Mine operated between the 1980s and 1990s and only a portion of the operation was reclaimed, which included the redistribution of stockpiled growth media and reestablishment of soil resources and vegetation. The Ruby Hill Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soils. Other past actions that have affected wildlife and fisheries resources include the development of roads, powerlines and other utilities, agricultural operations, fences, development and use of cattle and wild horse water sources, agricultural activities, and land development, and are estimated at 550 acres of surface disturbance. Impacts to wildlife and fisheries resources from these activities are considered from a habitat and population perspective and include removal or modification of habitat, or loud and sudden noises that could result in displacement. A number of these past and present actions, such as roads, fences, agricultural development, may result in habitat fragmentation and migration route disruption, as well as affecting the success of reproduction. The extent of these impacts vary with the type of activity.

Past actions that may have affected the LCT recovery stream of Henderson Creek are livestock grazing and production, dispersed recreation, powerline development and maintenance, and mineral exploration. These actions continue to have the potential to degrade the habitat through siltation of the streams, the removal of vegetation adjacent to the stream, and a decrease in stream bank stability.

Present Actions - Present actions within the CESA with the potential to impact wildlife and fisheries resources include the following activities: grazing, agricultural, and forest products activities on 28,736 acres, utilities and infrastructure activities on 51,375 acres, oil and gas development on approximately 283 acres; habitat stabilization, rehabilitation, and wild horse management activities on approximately 3,248 acres; wildland fires, fuels management, and reseeding projects on approximately 283,270 acres; minerals activities on approximately **2,513** acres; mine hazardous/solid waste and mine hazardous materials on approximately 40 acres; the ongoing Ruby Hill Mine, discussed above; and the Proposed Action would include 8,**355** acres of surface disturbance to wildlife and fisheries resources. Impacts to wildlife and fisheries resources from these activities are considered from a habitat and population perspective

Independence Valley
Willow Creek Valley
Kelley Creek Area
North Fork Area
Rock Creek Valley
Maggie Creek Area
HUMBOLDT COUNTY
Clovers Area
Susie Creek Area
Pumpernickel Valley
Elko
ELKO COUNTY
Elko Segment
SR 766
Boulder Flat
SR 227
Carlin
Marys Creek Area
Battle Mountain
80
Dixie Creek-Tenmile Creek Area
Whirlwind Valley
Buffalo Valley
Lower Reese River Valley
SR 306
SR 228
Crescent Valley
Huntington Valley
SR 305
Pine Valley
EUREKA COUNTY
Middle Reese River Valley
LANDER COUNTY
Carico Lake Valley
278
Antelope Valley
Grass Valley
Diamond Valley
WHITE PINE COUNTY
Upper Reese River Valley
Kobeh Valley
Newark Valley
Eureka
50
Antelope Valley
Little Smoky Valley

EXPLANATION

- Project Area Boundary
- Native American Traditional Values CESA
- Seeps and Springs (SRK)
- Seeps and Springs (Geomega)
- Seeps and Springs (BLM)
- Springs (USGS)
- Geothermal Springs (BLM and Geomega)
- Perennial Stream Segment
- Areas of Dewatering
- Hydrographic Basin Boundaries

N

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BATTLE MOUNTAIN DISTRICT OFFICE
Mount Lewis Field Office
50 Bastian Road
Battle Mountain, Nevada 89820

0 1 2 4 6 8 10 12 14 16 Miles

DESIGN:	DRAWN:	REVIEWED:
EMLLC	CVD/GSL	RFD
CHECKED:	APPROVED:	DATE:
-	RFD	08/02/2012

FILE NAME: p1635_Fig4-4-2_WatersInNativeAmericanCESA.mxd

BUREAU OF LAND MANAGEMENT

MOUNT HOPE PROJECT

DRAWING TITLE:

Perennial Waters and Areas of Dewatering within the Native American Traditional Values CESA

Figure 4.4.2

and include removal or modification of habitat, or loud and sudden noises that could result in displacement. The extent of these impacts varies with the type of activity.

Present actions that may have affected the LCT recovery stream of Henderson Creek and the sports fishery in Roberts Creek are grazing actions, wild horse, piñon-juniper encroachment, and dispersed recreation. The Proposed Action does not have any surface disturbance within the Pete Hansen Creek drainage. These actions have the potential to degrade the habitat through siltation of the streams, removal of vegetation adjacent to the stream, and a decrease in stream bank stability.

RFFAs - RFFAs within the CESA with the potential to impact wildlife and fisheries resources include the following activities: oil and gas development on approximately 577 acres; wildland fires, fuels management, and reseeding, forest products projects on approximately **522,500** acres; habitat stabilization, rehabilitation, and wild horse management activities on approximately 44,094 acres; minerals activities on approximately 1,**787** acres; 5,857 acres associated with land sales and their subsequent development; and mine hazardous/solid waste on approximately 80 acres. Impacts to wildlife and fisheries resources from these activities are considered from a habitat and population perspective and include removal or modification of habitat or loud and sudden noises that could result in displacement. The extent of these impacts vary with the type of activity. Other actions that could either positively or negatively affect wildlife and fisheries include the 3 Bars Landscape Restoration Project, wild horse management activities, recreational uses, dewatering activities associated with mining operations, ground water pumping associated with agricultural operations, and livestock uses.

RFFAs that may have affected the LCT recovery stream of Henderson Creek is grazing action and dispersed recreation. These actions have the potential to degrade the habitat through siltation of the streams, removal of vegetation adjacent to the stream, and a decrease in stream bank stability.

Total past actions, present actions, and RFFAs would result in up to approximately **954,808** acres of habitat disturbance in the CESA; however, approximately 44,094 acres of habitat disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements that would result in positive impacts to wildlife and fisheries resources in the CESA. Significant cumulative impacts to the wildlife and fisheries habitat in the CESA would not be anticipated because the vast majority of land would be reclaimed. Even though none of the perennial drainages, including those that support sport fisheries, would appear to be affected hydrologically **by the other past, present and RFFA projects**, there is a potential to affect stream flow through ground water pumping from the Proposed Action and thus affect the fisheries. Due to the widely dispersed nature of the existing and reasonably foreseeable individual mining projects within the CESA, cumulative noise and traffic impacts would not cause a substantial disturbance to wildlife populations or critically reduce use of their habitat.

Mitigation for impacts to wildlife resources is presently in Chapter 3 of this EIS and includes measures to protect greater sage-grouse, LCT, and migratory birds. Impacts to other wildlife and fisheries resources are below the level of significance.

4.4.22 Transportation and Access

Past Actions – The past actions that affected transportation and access center around actions that result in the movement of people and goods, as well as improvements to the transportation network itself. These actions include grazing activities, minerals development, land development and agricultural activities.

Present Actions – The present actions that affect transportations are essentially the same as those under the past actions. Section 3.24.2.2 outlines the current conditions associated with Transportation and access.

RFFAs - Transportation and access impacts from RFFAs could include limited or restricted use or access through specific areas from mineral exploration, mining, or fencing, or decreases in road quality. Transportation use would tend to be similar to those under the past and present actions. These impacts would tend to be localized near the activities.

The current access of the public lands within the Project Area are similar to those within the CESA and common to the region. The current transportation uses in the vicinity of the Project Area are similar to those with the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses (734-acre area of the open pit) within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, access through that portion of the Project Area would be substantially changed.

4.4.23 Forest Products

Past Actions - Past or historic mining operations include a few operations from the 1860s through the 1970s. It appears that essentially all of the historic mining operations occurred in the Eureka Mining District. The direct disturbance to forest projects is estimated to be approximately 200 acres. None of that disturbance was reclaimed. In addition, most of the trees in the surrounding mountain ranges were cut to produce charcoal for the smelting operations. Other past actions that have affected forestry products include the development of roads, powerlines and other utilities, fences, development of cattle and wild horse water sources, dispersed recreation, and land development and are estimated at 550 acres of surface disturbance. Impacts to forestry products from these activities include removal of vegetation, compaction, mixing, and erosion of soils. The extent of these impacts varies with the type of activity. The Bootstraps crew treated approximately 2,500 acres of piñon-juniper in the Willow and Vinini Creek drainages and in the Henderson Summit area in 2008 and 2009 under the Roberts Mountain Wildlife Habitat Enhancement Project EA completed in 2007.

Present Actions - Present actions include the ongoing Ruby Hill Mine, discussed above, as well as exploration activities under **52** notices**, three** plans of operations, **and four sand and gravel operations,** which are estimated at **1,308** acres that are not otherwise included under the past actions. The Proposed Action would include 8,3**55** acres of surface disturbance to vegetation, a significant portion of which is piñon and juniper. Other present actions that have an effect on forest products are a continuation of those activities outlined under past actions. The extent of the impacts varies with the type of activity. The Sulphur Springs Hazardous Fuels Reduction EA that was completed in 2009 has been partially implemented. The EA allows for the removal/thinning

of encroaching piñon-juniper from up to 3,000 acres of habitat containing healthy concentrations of bitterbrush. That part of the project has not yet been implemented. The BLM intends to initiate this project in 2011 with the Bootstraps crew, though most of the BLM's efforts would be focused on continuation of the Bald Mountain project initiated in 2010, if expected NRCS funding is approved.

RFFAs - RFFAs within the **CESA** would be similar to those under the present actions. Impacts to forestry products from these activities include removal of vegetation and compaction, mixing, and erosion of soils. The extent of these impacts varies with the type of activity. Other actions that could either positively or negatively affect forest products include the 3 Bars Landscape Restoration Project, wild horse management activities, recreational uses, dewatering activities associated with mining operations, ground water pumping associated with agricultural operations, and livestock uses.

Total past actions, present actions, and RFFAs would result in up to approximately **15,913** acres of surface disturbance that would affect forest products. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for forest products covers approximately 515,000 acres. Therefore, all actions within the CESA would affect approximately **three** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Proposed Action represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

4.5 No Action Alternative Impact Analysis

The resources that may be cumulatively impacted by the No Action Alternative include air quality, soils, water resources, vegetation, wildlife, special status species, visual, socioeconomics, noxious weeds and invasive-nonnative species, cultural, and wild horses; however, the cumulative impacts under the No Action Alternative are minimal compared to any of the action alternatives, including the Proposed Action. Activities under current authorizations would continue.

4.6 Partial Backfill Alternative Impact Analysis

The resources that may be cumulatively impacted by the Partial Backfill Alternative when combined with the past actions, present actions, and RFFAs include air quality, soils, water resources, vegetation, wildlife and fisheries, special status species, wetlands and riparian zones, livestock grazing and production, land use authorizations and access, visual, socioeconomics, geology and minerals, noxious weeds and invasive nonnative species, recreation and wilderness, historic trails, cultural resources, Native American Traditional Values, hazardous materials, and wild horses. The cumulative impacts under the Partial Backfill Alternative would be similar to the Proposed Action, due to similarity in size and scope of the operations under the alternative.

The Partial Backfill Alternative would have a slightly greater incremental increase in cumulative impacts to some of the resources (air resources and hazardous materials) due to the use and combustion of the fuel as part of the backfill operation and would result in less long-term surface disturbance compared to the Proposed Action due to the additional reclamation in the bottom of the backfilled open pit and less impact to water quantity and quality due to no development of a pit lake.

Criteria for assessing the significance of potential impacts to the resources are the same as those presented in Chapter 3. A discussion of the past actions, present actions, and RFFAs for each resource is incorporated in to Section 4.4 and are applicable to each resource discussion under this section.

4.6.1 Water Resources - Water Quantity

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quantity perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow model and pit lake chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan, as outlined in Section 2.1.16 of this EIS.

4.6.1.1 Surface Water Quantity

Cumulative activities indirectly affecting the surface water resources through the pumping of ground water was evaluated with ground water modeling of the cumulative actions that were modeled beyond 2200 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario, at year 2055, using the Proposed Action. Based on the analysis of the Partial Backfill Alternation in Section 3.2 of this EIS, the cumulative actions scenario using the Partial Backfill Alternative would be similar to, and no greater than the analysis using the Proposed Action. This analysis identifies a number of springs and streams on the western flank of the Diamond Mountains, the northern end of Diamond Valley, in the Roberts Mountains and in Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to surface water resources from the Proposed Action and RFFAs for ground water development would be significant. The Partial Backfill Alternative portion of the cumulative impacts is also considered significant and specific mitigation measures for the Partial Backfill Alternative effect are identified in Section 3.2.5.3. The cumulative actions, exclusive of the Partial Backfill Alternative, particularly the agricultural actions in Diamond Valley also have a significant effect on the surface water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

4.6.1.2 Ground Water Quantity

Ground water modeling of the cumulative activities affecting the ground water resources was conducted through year 2055 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario. This analysis identifies a number of wells

in Diamond Valley and Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to ground water resources from the Partial Backfill Alternative and RFFAs for ground water development would be significant. The Partial Backfill Alternative portion of the cumulative impacts is also considered significant and specific mitigation measures for the Partial Backfill Alternative effects are identified in Section 3.2.3.3. The cumulative actions, exclusive of the Partial Backfill Alternative, particularly the agricultural actions in Diamond Valley also have a significant effect on the ground water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

4.6.2 Water Resources - Water Quality

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quality perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow model and ground water chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan.

4.6.2.1 Surface Water Quality

The past, present, and RFFAs would potentially directly affect surface water resources through increased erosion and sedimentation. The mining-related cumulative actions would be required to implement erosion control measures that would limit their contribution to the cumulative impacts. Grazing has its own set of requirements that minimize effects to surface water quality. Dispersed recreation actions would not have the same requirements and thus would have a proportionally greater effect on surface water resources by removing vegetation and decreasing bank stability near streams and springs.

4.6.2.2 Ground Water Quality

Any potential cumulative impacts to ground water quality from the Partial Backfill Alternative, along with the past and present actions and the RFFAs for ground water would be significant, based on the criteria in Section 3.2, as a result of the backfilling of the open pit. The only two actions that have a quantitative assessment of potential ground water quality impacts are the Partial Backfill Alternative and the Ruby Hill Mine.

4.6.3 Geology and Mineral Resources

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **4,917** acres, **with** approximately 1,727 acres of disturbance anticipated under the RFFAs. This totals **6,644** acres of disturbance within the 1,809,522-acre CESA.

Mining is a major activity in the area, and it is likely that exploration activities and mining would continue. Additional impacts would result from the creation in the foreseeable future of additional open pit mining operations with WRDFs and processing facilities. The direct impacts affecting geology and mineral resources of the Partial Backfill Alternative due to the open pit mining would be the permanent removal of the identified mineral resources. The cumulative impacts to geology and mineral resources from the Partial Backfill Alternative and RFFAs for mineral development would not be significant. No mitigation is proposed.

4.6.4 Air Resources

Each of the identified individual projects within the CESA, including existing and proposed mining operations, emit air pollutants. With the possible exception of motor vehicle emissions, the existing and proposed mining operations are the major sources of criteria pollutants within the CESA. The modeling for the Proposed Action, which is representative of the Partial Backfill Alternative, as well as the Ruby Hill Mine, shows that the levels of these pollutants below the applicable standards. The Partial Backfill Alternative would not result in a significant cumulative impact to air resources. The RFFAs would result in additional emissions similar to those currently emitted by the existing operations within the CESA. In addition, the major sources of pollutants (except for motor vehicle emissions) within the CESA would operate under permit conditions established by the BAPC and therefore would not be significant.

4.6.5 Visual Resources

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **2,681** acres, **with** approximately **1,439** acres of disturbance anticipated under the RFFAs. Past and present actions, as well as RFFAs associated with agricultural actions have surface disturbance totaling approximately 29,496 acres. Past and present actions, as well as RFFAs associated with utilities and infrastructure actions have surface disturbance totaling approximately 51,823 acres. Past and present actions, as well as RFFAs associated with general development actions have surface disturbance totaling approximately 16,074 acres. These actions total approximately **101,713** acres of disturbance within the approximately 645,000-acre CESA for visual resources.

There are many actions that have an effect on the visual resources within the vicinity of the Project Area. The BLM's visual management for the Project Area allows for substantial change to the visual characteristics of the area. Therefore, the cumulative impacts to visual resources from the Partial Backfill Alternative, along with the past and present actions and the RFFAs would not be significant; however, activities to minimize the visual effects are incorporated in the Project reclamation plan. In addition, VRM classes do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities.

4.6.6 Soils

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect soil resources. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral,

geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for soil resources covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the soil resources within the CESA.

4.6.7 Vegetation Resources

Total past actions, present actions, and RFFAs would result in up to approximately **23,820** acres of surface disturbance that would affect vegetation. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for vegetation covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately 21 percent of the vegetation within the CESA. The Partial Backfill Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (207 acres) associated with the unbackfilled portion of the open pit of the Partial Backfill Alternative represents less than **one** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

The four special status plant species with potential habitat within the Project Area (Beatley buckwheat, least phacelia, Monte Neva Indian paintbrush, and windloving buckwheat) also have potential habitat within the CESA. None of these species has been documented as occurring within the CESA; however, no systematic survey has been completed. The cumulative effect and incremental loss of potential habitat for the four special status plant species resulting from past and present actions, proposed actions, and RFFAs would be below the level of significance.

4.6.8 Noxious Weeds, Invasive and Nonnative Species

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation, noxious weeds, and invasive, nonnative species. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for noxious weeds and invasive, nonnative species covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Partial Backfill Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (207 acres) associated with the unbackfilled portion of the open pit for the Partial Backfill Alternative represents less than two percent of the total surface disturbance resulting from past, present, and RFFAs.

An infestation of noxious weeds and invasive, nonnative species that starts in one project may expand to outside areas and increase the chance of the introduction of noxious weeds and

invasive, nonnative species to other disturbed locations. The **applicant committed practices** identified to reduce the potential impacts of the Partial Backfill alternative would help to control noxious weed establishment and spread within and adjacent to the Project Area; therefore, the cumulative and incremental effect of surface disturbance on noxious weed management would be below the level of significance.

4.6.9 Wetlands and Riparian Zones

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation; however, the disturbance is likely to occur in vegetation communities other than the riparian vegetation community. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for wetlands and riparian zones covers approximately 262,490 acres; therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Partial Backfill Alternative would disturb approximately three percent of the CESA, which includes an indirect effect to approximately four acres of riparian vegetation community. The amount of area that would not be reclaimed (207 acres) associated with the unbackfilled portion of the open pit for the Partial Backfill Alternative represents less than two percent of the total surface disturbance resulting from past, present, and RFFAs. The cumulative and incremental effect to wetlands and riparian zones would be significant. Mitigation for this alternative is outlined in Section 3.11.3.5.

4.6.10 Livestock Grazing and Production

Total past actions, present actions, and RFFAs would result in up to approximately **619,054** acres of surface disturbance in the CESA; however, approximately **44,094** acres of surface disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements, which would result in positive impacts to livestock grazing and production in the CESA. The majority of the **619,054** acres would be reclaimed and available for livestock grazing after the completion of reclamation activities. Approximately 781 AUMs would be lost in the Project Area due to the enclosure, which is six percent of the current active grazing preference.

4.6.11 Wild Horses

Total past actions, present actions, and RFFAs would result in up to approximately **18,058** acres of surface disturbance that would affect wild horses. The majority of this disturbance is associated with mining operations and is subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for wild horses covers approximately 253,610 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Partial Backfill Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (207 acres) associated with the unbackfilled portion of the open pit for the Partial Backfill Alternative represents less than two percent of the total surface disturbance resulting from past, present, and RFFAs. The implementation of mitigation measures identified in Chapter 3 of this EIS limit the loss of habitat

and water sources to wild horses in the Project Area by development of six water sources; therefore, the cumulative and incremental effects to wild horses would be below the level of significance.

4.6.12 Land Use

The current uses of the public lands within the Project Area are similar to those within the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, land use and access through that portion of the Project Area would be substantially changed.

4.6.13 Recreation and Wilderness Study Area

Total past actions, present actions, and RFFAs would result in up to approximately **993,032** acres of surface disturbance that would affect recreation, as well as potential indirect effects to high use recreation locations associated with the Roberts Creek drainage. The CESA for recreation and wilderness covers approximately 1,970,179 acres; therefore, approximately **50** percent of the CESA would be impacted. The present actions and RFFAs associated with mineral operations and other activities on BLM-administered lands are subject to reclamation requirements, which would restore areas for future use and minimize the long-term impacts. In addition, approximately 44,094 acres of surface disturbance is, or would be, associated with habitat stabilization and rehabilitation, which would result in positive impacts to recreation and wilderness in the CESA; therefore the quality of the area available for future recreational opportunities would be improved, and there would be, in the long term, no unmitigated loss of a unique recreational resource. While any one, or all, of the activities is occurring there would be a reduction in the quality of the recreational or wilderness experience in portions of the CESA.

It is not known which activities, other than the Partial Backfill Alternative, may result in restrictions to access of recreation areas, but very few restrictions are anticipated. The permanent access restriction as a result of the Partial Backfill Alternative would account for only 0.4 percent of the CESA; therefore, the cumulative and incremental effect of the permanent access restriction from public lands managed for multiple uses within the CESA would be below the level of significance.

4.6.14 Auditory Resources

Each of the identified individual projects within the CESA, including the proposed mining operations, contributes noise to the natural environment. Since the Partial Backfill Alternative is the principal and dominant noise generating activity within the CESA, the potential impacts are less than significant (Section 3.16.3.3), and any present actions and RFFAs would be dispersed throughout the CESA, none of the projects, including the Partial Backfill Alternative would result in a significant cumulative impact to the auditory resources.

4.6.15 Socioeconomic Values

The identified projects within the CESA, including the Partial Backfill Alternative, would **have both a positive and potentially adverse** impact on social and economic values in Eureka

County. As stated in Section 3.17, EML has and would continue to coordinate with Eureka County to address these impacts and minimize the short-term fiscal impacts on the County.

4.6.16 Environmental Justice Effects

Initial analysis concluded that the potential effects of the Project would not be expected to disproportionately affect any particular population. Environmental effects that may occur at a greater distance, such as auditory resource or air impacts, would affect the area's population equally, without regard to nationality or income level. Since no disproportionate effects on an identified minority population results from the Partial Backfill Alternative or the RFFAs, no further environmental justice analyses are required.

4.6.17 Hazardous Materials

The present actions and RFFAs within the CESA, including the proposed mining operations, contribute to potential hazardous materials effects to the natural environment. Since the Proposed Action is the principal hazardous materials generating activity within the CESA, the potential impacts are less than significant (Section 3.19.3.3), and any existing action and RFFAs such as traffic on SR 278 would be dispersed throughout the CESA, there would be no significant cumulative hazardous materials impact.

4.6.18 Historic Trails

The identified projects within the CESA, including the Partial Backfill Alternative have an impact on the visual setting for the historic trail by adding visual elements that may detract from the experience of those using the trail. These impacts are significant; however, the impacts would be less than those under the Proposed Action since the Non-PAG WRDF would be removed and transported to the open pit. Even with these activities, the open pit highwall would remain visible from the trail. In addition, there is no mitigation that could reduce the impact to less than significant. In addition, under the RFFA of the sale of a major portion of the Project Area, access through that portion of the Project Area could be eliminated.

4.6.19 Cultural Resources

The identified projects within the CESA, including the Partial Backfill Alternative have a direct physical impact on the cultural resources and an indirect impact on the visual setting for specific cultural resources that are potentially significant. Within the cumulative effects viewshed APE, a total of 436 eligible and unevaluated historic (361) and multi-component (75) sites with a historic component would be visually impacted. This number includes 152 officially eligible historic sites and 39 officially eligible multi-component sites with a historic elements within the Project APE (Table 3.21-1). Impacts to those sites would be mitigated through the implementation of a treatment plan. Outside of the Project APE and within the viewshed APE, an additional 245 eligible or unevaluated historic and historic component sites may be adversely impacted. All adverse effects under the NHPA and direct and indirect impacts under NEPA to known-eligible properties identified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. Therefore, no additional mitigation or monitoring is proposed. No

residual adverse effects are anticipated, as all known-eligible sites would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA.

4.6.20 Native American Traditional Values

The identified projects within the CESA, including the Partial Backfill Alternative have an impact on Native American Traditional Values, which include pine nut gathering and water resources. Although this alternative would not result in the removal of any piñon-only woodlands, the Partial Backfill Alternative's removal of piñon trees and limiting of access to other piñon trees in piñon-juniper woodlands within the fenced Project Area, relative to all other impacts to piñon trees, is not readily quantifiable; however, it is likely less than one percent of all the piñon trees within piñon-only and piñon-juniper woodlands in the CESA. In addition, the cumulative effect to piñon trees, relative to the total number of piñon trees within the Native American Traditional Values CESA is small (Figure 4.3.3) The Proposed Action's potential effect to water resources from ground water pumping, as shown on Figure 4.4.2, which is representative of the ground water pumping effects of the Partial Backfill Alternative, is isolated from the ground water pumping associated with the other mining operations within the Native American Traditional Values CESA. Figure 4.4.2 also shows the location of projects within the CESA where the removal or retrieval of prehistoric artifacts have occurred or may have occurred. Figure 4.4.2 does not show any potential effects from ground water pumping associated with agricultural operations. The Partial Backfill Alternative's potential effects to water resources is incrementally a small percent of the total potential effect to water resources from ground water pumping operations.

4.6.21 Wildlife and Fisheries Resources

Total past actions, present actions, and RFFAs would result in up to approximately **954,808** acres of habitat disturbance in the CESA; however, approximately 44,094 acres of habitat disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements that would result in positive impacts to wildlife and fisheries resources in the CESA. Significant cumulative impacts to the wildlife and fisheries habitat in the CESA would not be anticipated because the vast majority of land would be reclaimed. Even though none of the perennial drainages, including those that support sport fisheries, would appear to be affected hydrologically, there is a potential to affect stream flow through ground water pumping from the Partial Backfill Alternative and thus affect the fisheries. Due to the widely dispersed nature of the existing and reasonably foreseeable individual mining projects within the CESA, cumulative noise and traffic impacts would not cause a substantial disturbance to wildlife populations or critically reduce use of their habitat.

Mitigation for impacts to wildlife resources is presently in Chapter 3 of this EIS and includes measures to protect greater sage-grouse, LCT, and migratory birds. Impacts to other wildlife and fisheries resources are below the level of significance.

4.6.22 Transportation and Access

The current access of the public lands within the Project Area are similar to those within the CESA and common to the region. The current transportation uses in the vicinity of the Project Area are similar to those with the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses (207-acre area of the non-backfilled highwall) within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, access through that portion of the Project Area would be substantially changed.

4.6.23 Forest Products

Total past actions, present actions, and RFFAs would result in up to approximately **15,913** acres of surface disturbance that would affect forest products. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for forest products covers approximately 515,000 acres. Therefore, all actions within the CESA would affect approximately **three** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (207 acres) associated with the unbackfilled portion of the open pit for the Partial Backfill Alternative represents less than two percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

4.7 Off-Site Transfer of Ore Concentrate for Processing Alternative Impact Analysis

The resources which may be cumulatively impacted by the Off-Site Transfer of Ore Concentrate for Processing Alternative when combined with the past actions, present actions, and RFFAs include air quality, soils, water resources, vegetation, wildlife and fisheries, special status species, wetlands and riparian zones, livestock grazing and production, land use, transportation and access, visual, socioeconomics, geology and minerals, noxious weeds and invasive nonnative species, recreation and wilderness, historic trails, cultural resources, Native American traditional concerns, hazardous materials, forestry products, and wild horses. The cumulative impacts under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be similar to the Proposed Action, due to similarity in size and scope of the operations under the alternative. The Off-Site Transfer of Ore Concentrate for Processing Alternative would have a lesser incremental increase in cumulative impacts to some other resources (socioeconomics and air resources) compared to the Proposed Action due to the processing of the concentrate outside of the air resources CESA and the reduced number of employees and economic activity.

4.7.1 Water Resources - Water Quantity

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quantity perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow

model and pit lake chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan, as outlined in Section 2.1.16 of this EIS.

4.7.1.1 Surface Water Quantity

Cumulative activities indirectly affecting the surface water resources through the pumping of ground water was evaluated with ground water modeling of the cumulative actions that were modeled beyond 2200 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario, at year 2055, using the Proposed Action. Based on the analysis of the Off-Site Transfer of Ore Concentrate for Processing Alternation in Section 3.2 of this EIS, the cumulative actions scenario using the Off-Site Transfer of Ore Concentrate for Processing Alternative would be similar to, and no greater than the analysis using the Proposed Action. This analysis identifies a number of springs and streams on the western flank of the Diamond Mountains, the northern end of Diamond Valley, in the Roberts Mountains and in Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to surface water resources from the Off-Site Transfer of Ore Concentrate for Processing Alternative and RFFAs for ground water development would be significant. The Off-Site Transfer of Ore Concentrate for Processing Alternative portion of the cumulative impacts is also considered significant and specific mitigation measures for the Off-Site Transfer of Ore Concentrate for Processing Alternative effect are identified in Section 3.2.5.3. The cumulative actions, exclusive of the Off-Site Transfer of Ore Concentrate for Processing Alternative, particularly the agricultural actions in Diamond Valley also have a significant effect on the surface water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

4.7.1.2 Ground Water Quantity

Ground water modeling of the cumulative activities affecting the ground water resources was conducted through year 2055 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario. This analysis identifies a number of wells in Diamond Valley and Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to ground water resources from the Off-Site Transfer of Ore Concentrate for Processing Alternative and RFFAs for ground water development would be significant. The Off-Site Transfer of Ore Concentrate for Processing Alternative portion of the cumulative impacts is also considered significant and specific mitigation measures for the Off-Site Transfer of Ore Concentrate for Processing Alternative effect are identified in Section 3.2.6.3. The cumulative actions, exclusive of the Off-Site Transfer of Ore Concentrate for Processing Alternative, particularly the agricultural actions in Diamond Valley also have a significant effect on the ground water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

4.7.2 Water Resources - Water Quality

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quality perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow model and ground water chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan.

4.7.2.1 Surface Water Quality

The past, present, and RFFAs would potentially directly affect surface water resources through increased erosion and sedimentation. The mining-related cumulative actions would be required to implement erosion control measures that would limit their contribution to the cumulative impacts. Grazing has its own set of requirements that minimize effects to surface water quality. Dispersed recreation actions would not have the same requirements and thus would have a proportionally greater affect on surface water resources by removing vegetation and decreasing bank stability near streams and springs.

4.7.2.2 Ground Water Quality

Any potential cumulative impacts to ground water quality from the Off-Site Transfer of Ore Concentrate for Processing Alternative, along with the past and present actions and the RFFAs for ground water would not be significant, based on the criteria in Section 3.2. The only two actions that have a quantitative assessment of potential ground water quality impacts are the Off-Site Transfer of Ore Concentrate for Processing Alternative and the Ruby Hill Mine.

4.7.3 Geology and Mineral Resources

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **4,917** acres, **with** approximately 1,727 acres of disturbance anticipated under the RFFAs. This totals **6,644** acres of disturbance within the 1,809,522-acre CESA.

Mining is a major activity in the area, and it is likely that exploration activities and mining would continue. Additional impacts would result from the creation in the foreseeable future of additional open pit mining operations with WRDFs and processing facilities. The direct impacts affecting geology and mineral resources of the Off-Site Transfer of Ore Concentrate for Processing Alternative due to the open pit mining would be the permanent removal of the identified mineral resources. The cumulative impacts to geology and mineral resources from the Off-Site Transfer of Ore Concentrate for Processing Alternative and RFFAs for mineral development would be significant. No mitigation is proposed.

4.7.4 Air Resources

Each of the identified individual projects within the CESA, including existing and proposed mining operations, emit air pollutants. With the possible exception of motor vehicle emissions,

the existing and proposed mining operations are the major sources of criteria pollutants within the CESA. The modeling for the Proposed Action, which is representative of the Off-Site Transfer of Ore Concentrate for Processing Alternative, as well as the Ruby Hill Mine, shows that the levels of these pollutants below the applicable standards. The Off-Site Transfer of Ore Concentrate for Processing Alternative would not result in a significant cumulative impact to air resources. The RFFAs would result in additional emissions similar to those currently emitted by the existing operations within the CESA. In addition, the major sources of pollutants (except for motor vehicle emissions) within the CESA would operate under permit conditions established by the BAPC and therefore would not be significant.

4.7.5 Visual Resources

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **2,681** acres, **with** approximately 1,**439** acres of disturbance anticipated under the RFFAs. Past and present actions, as well as RFFAs associated with agricultural actions have surface disturbance totaling approximately 29,496 acres. Past and present actions, as well as RFFAs associated with utilities and infrastructure actions have surface disturbance totaling approximately 51,823 acres. Past and present actions, as well as RFFAs associated with general development actions have surface disturbance totaling approximately 16,074 acres. These actions total approximately **101,713** acres of disturbance within the approximately 645,000-acre CESA for visual resources.

There are many actions that have an effect on the visual resources within the vicinity of the Project Area. The BLM's visual management for the Project Area allows for substantial change to the visual characteristics of the area. Therefore, the cumulative impacts to visual resources from the Off-Site Transfer of Ore Concentrate for Processing Alternative, along with the past and present actions and the RFFAs would not be significant; however, activities to minimize the visual effects are incorporated in the Project reclamation plan. In addition, VRM classes do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities.

4.7.6 Soils

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect soil resources. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for soil resources covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the soil resources within the CESA.

4.7.7 Vegetation Resources

Total past actions, present actions, and RFFAs would result in up to approximately **23,820** acres of surface disturbance that would affect vegetation. The past actions are generally not subject to

any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for vegetation covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately 21 percent of the vegetation within the CESA. The Off-Site Transfer of Ore Concentrate for Processing Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Off-Site Transfer of Ore Concentrate for Processing Alternative represents less than **four** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

The four special status plant species with potential habitat within the Project Area (Beatley buckwheat, least phacelia, Monte Neva Indian paintbrush, and windloving buckwheat) also have potential habitat within the CESA. None of these species has been documented as occurring within the CESA; however, no systematic survey has been completed. The cumulative effect and incremental loss of potential habitat for the four special status plant species resulting from past and present actions, proposed actions, and RFFAs would be below the level of significance.

4.7.8 Noxious Weeds, Invasive and Nonnative Species

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation, noxious weeds, and invasive, nonnative species. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for noxious weeds and invasive, nonnative species covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Off-Site Transfer of Ore Concentrate for Processing Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Off-Site Transfer of Ore Concentrate for Processing Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs.

An infestation of noxious weeds and invasive, nonnative species that starts in one project may expand to outside areas and increase the chance of the introduction of noxious weeds and invasive, nonnative species to other disturbed locations. The **applicant committed practices** identified to reduce the potential impacts of the Off-Site Transfer of Ore Concentrate for Processing Alternative would help to control noxious weed establishment and spread within and adjacent to the Project Area; therefore, the cumulative and incremental effect of surface disturbance on noxious weed management would be below the level of significance.

4.7.9 Wetlands and Riparian Zones

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation; however, this disturbance is likely to occur in vegetation communities other than the riparian community. The past actions are generally not

subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for wetlands and riparian zones covers approximately 262,490 acres; therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA, which includes an indirect affect to approximately four acres of riparian vegetation community. The Off-Site Transfer of Ore Concentrate for Processing Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Off-Site Transfer of Ore Concentrate for Processing Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The cumulative and incremental effect to wetlands and riparian zones would be significant.

4.7.10 Livestock Grazing and Production

Total past actions, present actions, and RFFAs would result in up to approximately **619,054** acres of surface disturbance in the CESA; however, approximately **44,094** acres of surface disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements, which would result in positive impacts to livestock grazing and production in the CESA. The majority of the **619,054** acres would be reclaimed and available for livestock grazing after the completion of reclamation activities. Approximately 781 AUMs would be lost in the Project Area due to the enclosure which is six percent of the current active grazing preference.

4.7.11 Wild Horses

Total past actions, present actions, and RFFAs would result in up to approximately **18,058** acres of surface disturbance that would affect wild horses. The majority of this disturbance is associated with mining operations and is subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for wild horses covers approximately 253,610 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Off-Site Transfer of Ore Concentrate for Processing Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Off-Site Transfer of Ore Concentrate for Processing Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The implementation of mitigation measures identified in Chapter 3 of this EIS limit the loss of habitat and water sources to wild horses in the Project Area by development of six water sources; therefore, the cumulative and incremental effects to wild horses would be below the level of significance.

4.7.12 Land Use

The current uses of the public lands within the Project Area are similar to those within the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, land use and access through that portion of the Project Area would be substantially changed.

4.7.13 Recreation and Wilderness Study Area

Total past actions, present actions, and RFFAs would result in up to approximately **993,032** acres of surface disturbance that would affect recreation, as well as potential indirect effects to high use recreation locations associated with the Roberts Creek drainage. The CESA for recreation and wilderness covers approximately 1,970,179 acres; therefore, approximately **50** percent of the CESA would be impacted. The present actions and RFFAs associated with mineral operations and other activities on BLM-administered lands are subject to reclamation requirements, which would restore areas for future use and minimize the long-term impacts. In addition, approximately 44,094 acres of surface disturbance is, or would be, associated with habitat stabilization and rehabilitation, which would result in positive impacts to recreation and wilderness in the CESA; therefore the quality of the area available for future recreational opportunities would be improved, and there would be no unmitigated loss of a unique recreational resource. While any one, or all, of the activities occurs there would be a reduction in the quality of the recreational or wilderness experience in portions of the CESA.

It is not known which activities, other than the Off-Site Transfer of Ore Concentrate for Processing Alternative, may result in restrictions to access of recreation areas, but very few restrictions are anticipated. The permanent access restriction as a result of the Off-Site Transfer of Ore Concentrate for Processing Alternative would account for only 0.4 percent of the CESA; therefore, the cumulative and incremental effect of the permanent access restriction from public lands managed for multiple uses within the CESA would be below the level of significance.

4.7.14 Auditory Resources

Each of the identified individual projects within the CESA, including the proposed mining operations, contributes noise to the natural environment. Since the Off-Site Transfer of Ore Concentrate for Processing Alternative is the principal and dominant noise generating activity within the CESA, the potential impacts are less than significant (Section 3.16.3.3), and any present actions and RFFAs would be dispersed throughout the CESA, none of the projects including the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in a significant cumulative impact to the auditory resources.

4.7.15 Socioeconomic Values

The identified projects within the CESA, including the Off-Site Transfer of Ore Concentrate for Processing Alternative, would have a net beneficial impact on social and economic values in Eureka County. As stated in Section 3.17, EML has and would continue to coordinate with Eureka County to address these impacts and minimize the short-term fiscal impacts on the County.

4.7.16 Environmental Justice Effects

Initial analysis concluded that the potential effects of the Project would not be expected to disproportionately affect any particular population. Environmental effects that may occur at a greater distance, such as auditory resource or air impacts, would affect the area's population equally, without regard to nationality or income level. Since no disproportionate effects on an

identified minority population results from the Off-Site Transfer of Ore Concentrate for Processing Alternative or the RFFAs, no further environmental justice analyses are required.

4.7.17 Hazardous Materials

The present actions and RFFAs within the CESA, including the proposed mining operations, contribute to potential hazardous materials effects to the natural environment. Since the Proposed Action is the principal hazardous materials generating activity within the CESA, the potential impacts are less than significant (Section 3.19.3.3), and any existing action and RFFAs such as traffic on SR 278 would be dispersed throughout the CESA, there would be no significant cumulative hazardous materials impact.

4.7.18 Historic Trails

The identified projects within the CESA, including the Off-Site Transfer of Ore Concentrate for Processing Alternative have an impact on the visual setting for the historic trail by adding visual elements that may detract from the experience of those using the trail. These impacts are significant. In addition, there is no mitigation that could reduce the impact to less than significant. In addition, under the RFFA of the sale of a major portion of the Project Area, access through that portion of the Project Area could be eliminated.

4.7.19 Cultural Resources

The identified projects within the CESA, including the Off-Site Transfer of Ore Concentrate for Processing Alternative have a direct physical impact on the cultural resources and an indirect impact on the visual setting for specific cultural resources that are potentially significant. Within the cumulative effects viewshed APE, a total of 436 eligible and unevaluated historic (361) and multi-component (75) sites with a historic component would be visually impacted. This number includes 152 officially eligible historic sites and 39 officially eligible multi-component sites with a historic element within the Project APE (Table 3.21-1). Impacts to these sites would be mitigated through the implementation of a treatment plan. Outside of the Project APE and within the viewshed APE, an additional 245 eligible or unevaluated historic and historic component sites may be adversely impacted. All adverse effects under the NHPA and direct and indirect impacts under NEPA to known-eligible properties identified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. Therefore, no additional mitigation or monitoring is proposed. No residual adverse effects are anticipated, as all known-eligible sites would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA.

4.7.20 Native American Traditional Values

The identified projects within the CESA, including the Off-Site Transfer of Ore Concentrate for Processing Alternative have an impact on Native American Traditional Values, which include pine nut gathering and water resources. Although this alternative would not result in the removal of any piñon-only woodlands, the Off-Site Transfer of Ore Concentrate for Processing

Alternative's removal of piñon trees and limiting of access to other piñon trees in piñon-juniper woodlands within the fenced Project Area, relative to all other impacts to piñon trees, is not readily quantifiable; however, it is likely less than one percent of all the piñon trees within piñon-only and piñon-juniper woodlands in the CESA. In addition, the cumulative effect to piñon trees, relative to the total number of piñon trees within the Native American Traditional Values CESA is small (Figure 4.3.3) The Proposed Action's potential effect to water resources from ground water pumping, as shown on Figure 4.4.2, which is representative of the ground water pumping effects of the Off-Site Transfer of Ore Concentrate for Processing Alternative, is isolated from the ground water pumping associated with the other mining operations within the Native American Traditional Values CESA. Figure 4.4.2 also shows the location of projects within the CESA where the removal or retrieval of prehistoric artifacts have occurred or may have occurred. Figure 4.4.2 does not show any potential effects from ground water pumping associated with agricultural operations. The Off-Site Transfer of Ore Concentrate for Processing Alternative's potential effects to water resources is incrementally a small percent of the total potential effect to water resources from ground water pumping operations.

4.7.21 Wildlife and Fisheries Resources

Total past actions, present actions, and RFFAs would result in up to approximately **954,808** acres of habitat disturbance in the CESA; however, approximately 44,094 acres of habitat disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements that would result in positive impacts to wildlife and fisheries resources in the CESA. Significant cumulative impacts to the wildlife and fisheries habitat in the CESA would not be anticipated because the vast majority of land would be reclaimed. Even though none of the perennial drainages, including those that support sport fisheries, would appear to be affected hydrologically, there is a potential to affect stream flow through ground water pumping from the Off-Site Transfer of Ore Concentrate for Processing Alternative and thus affect the fisheries. Due to the widely dispersed nature of the existing and reasonably foreseeable individual mining projects within the CESA, cumulative noise and traffic impacts would not cause a substantial disturbance to wildlife populations or critically reduce use of their habitat.

Mitigation for impacts to wildlife resources is presently in Chapter 3 of this EIS and includes measures to protect greater sage-grouse, LCT, and migratory birds. Impacts to other wildlife and fisheries resources are below the level of significance.

4.7.22 Transportation and Access

The current access of the public lands within the Project Area are similar to those within the CESA and common to the region. The current transportation uses in the vicinity of the Project Area are similar to those with the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses (734-acre area of the open pit) within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, access through that portion of the Project Area would be substantially changed.

4.7.23 Forest Products

Total past actions, present actions, and RFFAs would result in up to approximately **15,913** acres of surface disturbance that would affect forest products. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for forest products covers approximately 515,000 acres. Therefore, all actions within the CESA would affect approximately **three** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Off-Site Transfer of Ore Concentrate for Processing Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

4.8 Slower, Longer Project Alternative Impact Analysis

The resources that may be cumulatively impacted by the Slower, Longer Project Alternative when combined with the past actions, present actions, and RFFAs include air quality, soils, water, vegetation, wildlife and fisheries, special status species, wetlands and riparian zones, livestock grazing and production, land use authorizations and access, visual, socioeconomics, geology and minerals, noxious weeds and invasive nonnative species, recreation and wilderness, historic trails, cultural resources, Native American Traditional Values, hazardous materials, and wild horses. The cumulative impacts under the Slower, Longer Project Alternative would be similar to the Proposed Action, due to similarity in size and scope of the operations under the alternative. The Slower, Longer Project Alternative would have a lesser incremental increase in cumulative impacts to some other resources (socioeconomics and air resources) compared to the Proposed Action due to the extended time frame over which this alternative would occur.

4.8.1 Water Resources - Water Quantity

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quantity perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow model and pit lake chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan, as outlined in Section 2.1.16 of this EIS.

4.8.1.1 Surface Water Quantity

Cumulative activities indirectly affecting the surface water resources through the pumping of ground water was evaluated with ground water modeling of the cumulative actions that were modeled beyond 2200 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario, at year 2055, using the Proposed Action. Based on the analysis of the Slower, Longer Project Alternation in Section 3.2 of this EIS, the cumulative actions scenario using the Slower, Longer Project Alternative would be similar to, and possibly

greater than the analysis using the Proposed Action. This analysis identifies a number of springs and streams on the western flank of the Diamond Mountains, the northern end of Diamond Valley, in the Roberts Mountains and in Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to surface water resources from the Slower, Longer Project Alternative and RFFAs for ground water development would be significant. The Slower, Longer Project Alternative portion of the cumulative impacts is also considered significant and specific mitigation measures for the Slower, Longer Project Alternative effect are identified in Section 3.2.7.3. The cumulative actions, exclusive of the Slower, Longer Project Alternative, particularly the agricultural actions in Diamond Valley also have a significant effect on the surface water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

4.8.1.2 Ground Water Quantity

Ground water modeling of the cumulative activities affecting the ground water resources was conducted through year 2055 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario. This analysis identifies a number of wells in Diamond Valley and Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to ground water resources from the Slower, Longer Project Alternative and RFFAs for ground water development would be significant. Slower, Longer Project Alternative portion of the cumulative impacts is also considered significant and specific mitigation measures for the Slower, Longer Project Alternative effect are identified in Section 3.2.6.3. The cumulative actions, exclusive of the Slower, Longer Project Alternative, particularly the agricultural actions in Diamond Valley also have a significant effect on the ground water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

4.8.2 Water Resources - Water Quality

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quality perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow model and ground water chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan.

4.8.2.1 Surface Water Quality

The past, present, and RFFAs would potentially directly affect surface water resources through increased erosion and sedimentation. The mining-related cumulative actions would be required to implement erosion control measures that would limit their contribution to the cumulative impacts. Grazing has its own set of requirements that minimize effects to surface water quality. Dispersed recreation actions would not have the same requirements and thus would have a

proportionally greater affect on surface water resources by removing vegetation and decreasing bank stability near streams and springs.

4.8.2.2 Ground Water Quality

Any potential cumulative impacts to ground water quality from the Slower, Longer Project Alternative, along with the past and present actions and the RFFAs for ground water would not be significant, based on the criteria in Section 3.2. The only two actions that have a quantitative assessment of potential ground water quality impacts are the Slower, Longer Project Alternative and the Ruby Hill Mine.

4.8.3 Geology and Mineral Resources

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **4,917** acres, **with** approximately 1,**727** acres of disturbance anticipated under the RFFAs. This totals **6,644** acres of disturbance within the 1,809,522-acre CESA.

Mining is a major activity in the area, and it is likely that exploration activities and mining would continue. Additional impacts would result from the creation in the foreseeable future of additional open pit mining operations with WRDFs and processing facilities. The direct impacts affecting geology and mineral resources of the Slower, Longer Project Alternative due to the open pit mining would be the permanent removal of the identified mineral resources. The cumulative impacts to geology and mineral resources from the Slower, Longer Project Alternative and RFFAs for mineral development would not be significant. No mitigation is proposed.

4.8.4 Air Resources

Each of the identified individual projects within the CESA, including existing and proposed mining operations, emit air pollutants. With the possible exception of motor vehicle emissions, the existing and proposed mining operations are the major sources of criteria pollutants within the CESA. The modeling for the Proposed Action, which is representative of the Slower, Longer Project Alternative, as well as the Ruby Hill Mine, shows that the levels of these pollutants below the applicable standards. The Slower, Longer Project Alternative would not result in a significant cumulative impact to air resources. The RFFAs would result in additional emissions similar to those currently emitted by the existing operations within the CESA. In addition, the major sources of pollutants (except for motor vehicle emissions) within the CESA would operate under permit conditions established by the BAPC and therefore would not be significant.

4.8.5 Visual Resources

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **2,681** acres, **with** approximately 1,**439** acres of disturbance anticipated under the RFFAs. Past and present actions, as well as RFFAs associated with agricultural actions have surface

disturbance totaling approximately 29,496 acres. Past and present actions, as well as RFFAs associated with utilities and infrastructure actions have surface disturbance totaling approximately 51,823 acres. Past and present actions, as well as RFFAs associated with general development actions have surface disturbance totaling approximately 16,074 acres. These actions total approximately **101,713** acres of disturbance within the approximately 645,000-acre CESA for visual resources.

There are many actions that have an effect on the visual resources within the vicinity of the Project Area. The BLM's visual management for the Project Area allows for substantial change to the visual characteristics of the area. Therefore, the cumulative impacts to visual resources from the Slower, Longer Project Alternative, along with the past and present actions and the RFFAs would not be significant; however, activities to minimize the visual effects are incorporated in the Project reclamation plan. In addition, VRM classes do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities.

4.8.6 Soils

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect soil resources. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for soil resources covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the soil resources within the CESA.

4.8.7 Vegetation Resources

Total past actions, present actions, and RFFAs would result in up to approximately **23,820** acres of surface disturbance that would affect vegetation. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for vegetation covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately 21 percent of the vegetation within the CESA. The Slower, Longer Project Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Slower, Longer Project Alternative represents less than **four** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

The four special status plant species with potential habitat within the Project Area (Beatley buckwheat, least phacelia, Monte Neva Indian paintbrush, and windloving buckwheat) also have potential habitat within the CESA. None of these species has been documented as occurring within the CESA; however, no systematic survey has been completed. The cumulative effect and

incremental loss of potential habitat for the four special status plant species resulting from past and present actions, proposed actions, and RFFAs would be below the level of significance.

4.8.8 Noxious Weeds, Invasive and Nonnative Species

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation, noxious weeds, and invasive, nonnative species. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for noxious weeds and invasive, nonnative species covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Slower, Longer Project Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Slower, Longer Project Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs.

An infestation of noxious weeds and invasive, nonnative species that starts in one project may expand to outside areas and increase the chance of the introduction of noxious weeds and invasive, nonnative species to other disturbed locations. The **applicant committed practices** identified to reduce the potential impacts of the Slower, Longer Project Alternative would help to control noxious weed establishment and spread within and adjacent to the Project Area; therefore, the cumulative and incremental effect of surface disturbance on noxious weed management would be below the level of significance.

4.8.9 Wetlands and Riparian Zones

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation; however, this disturbance is likely to occur in vegetation communities other than the riparian vegetation community. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for wetlands and riparian zones covers approximately 262,490 acres; therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA, which includes an indirect impact to approximately five acres of riparian vegetation community. The Slower, Longer Project Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Slower, Longer Project Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The cumulative and incremental effect to wetlands and riparian zones would be below the level of significance. Mitigation for this alternative is outlined in Section 3.11.3.7.

4.8.10 Livestock Grazing and Production

Total past actions, present actions, and RFFAs would result in up to approximately **619,054** acres of surface disturbance in the CESA; however, approximately **44,094** acres of surface disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements, which would result in positive impacts to livestock grazing and production in the CESA. The majority of the **619,054** acres would be reclaimed and available for livestock grazing after the completion of reclamation activities. Approximately 781 AUMs would be lost in the Project Area due to the enclosure which is six percent of the current active grazing preference.

4.8.11 Wild Horses

Total past actions, present actions, and RFFAs would result in up to approximately **18,058** acres of surface disturbance that would affect wild horses. The majority of this disturbance is associated with mining operations and is subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for wild horses covers approximately 253,610 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Slower, Longer Project Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Slower, Longer Project Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The implementation of mitigation measures identified in Chapter 3 of this EIS limit the loss of habitat and water sources to wild horses in the Project Area by development of six water sources; therefore, the cumulative and incremental effects to wild horses would be below the level of significance.

4.8.12 Land Use

The current uses of the public lands within the Project Area are similar to those within the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, land use and access through that portion of the Project Area would be substantially changed.

4.8.13 Recreation and Wilderness Study Area

Total past actions, present actions, and RFFAs would result in up to approximately **993,032** acres of surface disturbance that would affect recreation, as well as potential indirect effects to high use recreation locations associated with the Roberts Creek drainage. The CESA for recreation and wilderness covers approximately 1,970,179 acres; therefore, approximately **50** percent of the CESA would be impacted. The present actions and RFFAs associated with mineral operations and other activities on BLM-administered lands are subject to reclamation requirements, which would restore areas for future use and minimize the long-term impacts. In addition, approximately 44,094 acres of surface disturbance is, or would be, associated with habitat stabilization and rehabilitation, which would result in positive impacts to recreation and wilderness in the CESA; therefore the quality of the area available for future recreational opportunities would be improved, and there would be no unmitigated loss of a unique

recreational resource. While any one, or all, of these activities occurs there would be a reduction in the quality of the recreational or wilderness experience in portions of the CESA.

It is not known which activities, other than the Slower, Longer Project Alternative, may result in restrictions to access of recreation areas, but very few restrictions are anticipated. The permanent access restriction as a result of the Slower, Longer Project Alternative would account for only 0.04 percent of the CESA; therefore, the cumulative and incremental effect of the permanent access restriction from public lands managed for multiple uses within the CESA would be below the level of significance.

4.8.14 Auditory Resources

Each of the identified individual projects within the CESA, including the proposed mining operations, contributes noise to the natural environment. Since the Slower, Longer Project Alternative is the principal and dominant noise generating activity within the CESA, its potential impacts are less than significant (Section 3.16.3.3), and any present actions and RFFAs would be dispersed throughout the CESA, none of the projects including the Slower, Longer Project Alternative would result in a significant cumulative impact to the auditory resources.

4.8.15 Socioeconomic Values

The identified projects within the CESA, including the Slower, Longer Project Alternative, would have a net beneficial impact on social and economic values in Eureka County. As stated in Section 3.17, EML has and would continue to coordinate with Eureka County to address these impacts and minimize the short-term fiscal impacts on the County.

4.8.16 Environmental Justice Effects

Initial analysis concluded that the potential effects of the Project are not expected to disproportionately affect any particular population. Environmental effects that may occur at a greater distance, such as auditory resource or air impacts, would affect the area's population equally, without regard to nationality or income level. Since no disproportionate effect on an identified minority population results from the Slower, Longer Project Alternative or the RFFAs, no further environmental justice analyses are required.

4.8.17 Hazardous Materials

The present actions and RFFAs within the CESA, including the proposed mining operations, contribute to potential hazardous materials effects to the natural environment. Since the Proposed Action is the principal hazardous materials generating activity within the CESA, its potential impacts are less than significant (Section 3.19.3.3), and any existing action and RFFAs such as traffic on SR 278 would be dispersed throughout the CESA, there would be no significant cumulative hazardous materials impact.

4.8.18 Historic Trails

The identified projects within the CESA, including the Slower, Longer Project Alternative have an impact on the visual setting for the historic trail by adding visual elements that may detract

from the experience of those using the trail. These impacts are significant. In addition, there is no mitigation that could reduce the impact to less than significant. In addition, under the RFFA of the sale of a major portion of the Project Area, access through that portion of the Project Area could be eliminated.

4.8.19 Cultural Resources

The identified projects within the CESA, including the Slower, Longer Project Alternative have a direct physical impact on the cultural resources and an indirect impact on the visual setting for specific cultural resources that are potentially significant. Within the cumulative effects viewshed APE, a total of 436 eligible and unevaluated historic (361) and multi-component (75) sites with a historic component would be visually impacted. This number includes 152 officially eligible historic sites and 39 officially eligible multi-component sites with a historic element within the Project APE (Table 3.21-1). Impacts to these sites would be mitigated through the implementation of a treatment plan. Outside of the Project APE and within the viewshed APE, an additional 245 eligible or unevaluated historic and historic component sites may be adversely impacted. All adverse effects under the NHPA and direct and indirect impacts under NEPA to known-eligible properties identified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. Therefore, no additional mitigation or monitoring is proposed. No residual adverse effects are anticipated, as all known-eligible sites would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA.

4.8.20 Native American Traditional Values

The identified projects within the CESA, including the Slower, Longer Project Alternative have an impact on Native American Traditional Values, which include pine nut gathering and water resources. Although this alternative would not result in the removal of any piñon-only woodlands, the Slower, Longer Project Alternative's removal of piñon trees and limiting of access to other piñon trees in piñon-juniper woodland within the fenced Project Area, relative to all other impacts to piñon trees, is not readily quantifiable; however, it is likely less than one percent of all the piñon trees within the piñon-only and piñon-juniper woodlands in the CESA. In addition, the cumulative effect to piñon trees, relative to the total number of piñon trees within the Native American CESA is small (Figure 4.3.3) The Proposed Action's potential effect to water resources from ground water pumping, as shown on Figure 4.4.2, which is representative of the ground water pumping effects of the Slower, Longer Project Alternative, is isolated from the ground water pumping associated with the other mining operations within the Native American CESA. Figure 4.4.2 also shows the location of projects within the CESA where the removal or retrieval of pre-historic artifacts have occurred or may have occurred. Figure 4.4.2 does not show any potential effects from ground water pumping associated with agricultural operations. The Slower, Longer Project Alternative's potential effects to water resources is incrementally a small percent of the total potential effect to water resources from ground water pumping operations.

4.8.21 Wildlife and Fisheries Resources

Total past actions, present actions, and RFFAs would result in up to approximately **954,808** acres of habitat disturbance in the CESA; however, approximately 44,094 acres of habitat disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements that would result in positive impacts to wildlife and fisheries resources in the CESA. Significant cumulative impacts to the wildlife and fisheries habitat in the CESA would not be anticipated because the vast majority of land would be reclaimed. Even though none of the perennial drainages, including those that support sport fisheries, would appear to be affected hydrologically, there is a potential to affect stream flow through ground water pumping from the Slower, Longer Project Alternative and thus affect the fisheries **and wildlife to a greater extent than the Proposed Action because of the greater extent of ground water drawdown and the longer duration of the Project**. Due to the widely dispersed nature of the existing and reasonably foreseeable individual mining projects within the CESA, cumulative noise and traffic impacts would not cause a substantial disturbance to wildlife populations or critically reduce use of their habitat.

Mitigation for impacts to wildlife resources is presently in Chapter 3 of this EIS and includes measures to protect greater sage-grouse, LCT, and migratory birds. Impacts to other wildlife and fisheries resources are below the level of significance.

4.8.22 Transportation and Access

The current access of the public lands within the Project Area are similar to those within the CESA and common to the region. The current transportation uses in the vicinity of the Project Area are similar to those with the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses (734-acre area of the open pit) within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, access through that portion of the Project Area would be substantially changed.

4.8.23 Forest Products

Total past actions, present actions, and RFFAs would result in up to approximately **15,913** acres of surface disturbance that would affect forest products. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for forest products covers approximately 515,000 acres. Therefore, all actions within the CESA would affect approximately **three** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Slower, Longer Project Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

4.9 Irreversible/Irretrievable Commitment of Resources

Construction and operation of the Project could result in either the irreversible or irretrievable commitment of certain resources. Irreversible is a term that describes the loss of future options. It applies primarily to the effects of use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over very long periods of time. Irretrievable is a term that applies to the loss of production, harvest, or use of natural resources. For example, livestock forage production from an area is lost while an area is serving as a mining area. The production lost is irretrievable, but the action is not irreversible. If the use changes and the mine is reclaimed, it is possible to resume forage production. Irreversible and irretrievable impacts of the Proposed Action are summarized in Table 4.9-1.

Table 4.9-1: Irreversible and Irretrievable Commitment of Resources by the Proposed Action

Resource	Irreversible Impacts	Irretrievable Impacts	Explanation
Water Resources-Water Quantity	Yes	Yes	Water removed from the aquifer and used in the operations would not be available for other uses. In addition, springs and surface waters may have decreased flows and limited uses.
Water Resources-Water Quality	No	No	The Proposed Action would not result in an irreversible or irretrievable commitment of resources.
Geology and Mineral Resources	Yes	Yes	Mineral resources that are mined would no longer be available for future production.
Paleontology	No	No	The Proposed Action would not result in an irreversible or irretrievable commitment of resources.
Air Resources	No	No	Emissions from the Project would not deteriorate the existing air quality of the air basin. In addition, air impacts are not considered irreversible because they would cease when mining operations cease.
Visual Resources	Yes	Yes	Impacts to visual resources would result in unavoidable physical changes in the existing contour, line, texture, and character of the Project Area. The changes would be visually apparent over the active life of the Project. These would diminish through the completion of reclamation and revegetation activities; however, they would not be eliminated.
Soil Resources	Yes	**Yes**	Soils from the open pit, waste rock dump, and heap leach/tailings areas would be salvaged for use in the reclamation activities. There would be a permanent loss of soil from wind and water erosion, as well as some amount of soil that would not be recovered and stockpiled.
Vegetation Resources	Yes	Yes	A total of 734 acres of vegetation would be lost as a result of the open pit development. There is a potential for a **change in phreatophyte composition and percent cover** in **the** drawdown area in Kobeh Valley.
Invasive Nonnative Species	No	No	Implementation of reclamation and the noxious weed monitoring and control plan would reduce or eliminate the establishment of noxious weed infestations.

Resource	Irreversible Impacts	Irretrievable Impacts	Explanation
Wetland/ Riparian Zones	No	Yes	Certain springs and their associated wetlands would be removed or buried as a result of the development of the open pit and WRDFS. Following Project completion and reclamation, residual adverse impacts to riparian zones from the Proposed Action would be minor. The Project would not result in the removal or disturbance of wetlands in the Project Area.
Livestock Grazing and Production	Yes	Yes	There would be a loss of 781 AUMs associated with the Project **that would be reversible. There would be an irreversible and irretrievable loss of 32 AUMs.**
Wild Horses	Yes	Yes	The Proposed Action would result in the unavoidable loss of up to 734 acres of wild horse foraging habitat resulting from surface disturbance in the open pit area. In addition, in the short term, wild horses would lose access to over approximately 14,204 acres of habitat, which equates to a large portion of their existing HMAs. Wild horses would also be affected by the loss of water sources. Once reclaimed, the mine site may not be usable due to lack of waters. Also, water drawdown could cause permanent loss of riparian systems, and even if water levels resume, the loss of seed source, permanent change of soils, and the site may not be able to support riparian systems again.
Land Use	Yes	Yes	The Proposed Action would result in the unavoidable loss of up to 734 acres of public lands utilized for livestock grazing and mineral exploration. There would be no residual impact to access resulting from the Proposed Action. The Proposed Action would have the unavoidable, but reversible, indirect potential to adversely affect access through the Project Area for the life of the Project.
Recreation and Wilderness	Yes	Yes	The Proposed Action would result in the unavoidable loss of up to 14,204 acres in the short term, and an unavoidable and adverse loss of 734 acres in the long term of public land managed for multiple uses, including dispersed recreation. Certain recreation opportunities associated with surface water features may be indirectly affected due to the drawdown of the water table.
Auditory Resources	No	No	Noise is not considered irreversible because it would cease when mining operations cease.
Socioeconomic Values	Yes	**Yes**	The economic wealth generated from the production and further use of the molybdenite resources underlying the Project would be irreversible. The jobs, income, and taxes created over the life of the Project reflects irreversible resource commitment to achieve such production, but also represents a measure of economic benefits associated with the Project. **The economic value associated with the molybdenite resources underlying the Project would be irreversible once removed. The unavoidable long-term loss of 734 acres of public land managed for multiple users represents an irretrievable social and economic impact with respect to loss in recreation opportunity and AUMs. This irretrievable impact is relatively small when compared to the availability of recreation and AUMs in the vicinity of the Project.**
Environmental Justice	No	No	No irreversible or irretrievable environmental justice issues have been identified as a result of the Proposed Action.

Resource	Irreversible Impacts	Irretrievable Impacts	Explanation
Hazardous Materials	No	No	No irreversible or irretrievable hazardous materials impacts are anticipated; however, if a spill were to affect a sensitive resource, an irretrievable impact could occur pending the recovery of the resource.
Historic Trails	Yes	No	The visual setting for the historic trail is irreversible changed by the Project. The overall impact to historic trail access is not irreversible or irretrievable.
Cultural Resources	Yes	Yes	With the implementation of mitigation measures, the Proposed Action would result in a less than significant impact; however, the potential impact would remain an irreversible and irretrievable commitment of cultural resources.
Native American Traditional Values	Yes	Yes	The removal of cultural sites from the landscape is an irretrievable commitment of Native American resources. No other irreversible or irretrievable impacts to Native American Traditional Values have been identified as a result of the Proposed Action.
Wildlife and Fisheries Resources	Yes	Yes	A total of 734 acres of wildlife habitat would be lost as a result of the open pit development.
Transportation and Access	No	No	No other irreversible or irretrievable impacts to Transportation and Access have been identified as a result of the Proposed Action.
Forest Products	No	Yes	Forestry products in the area of the open pit would be irretrievably committed as a result of the development of the open pit.

5 CONSULTATION, COORDINATION, PUBLIC INVOLVEMENT, AND THE LIST OF PREPARERS FOR PREPARATION OF THE EIS

5.1 Public Scoping

The scoping period was initiated by publication in the **FR** of a NOI to prepare an EIS for the Project (Volume 72, No. 41, Friday, March 2, 2007, Page 9579). In addition, the BLM prepared and distributed news releases to the Elko Daily Free Press, Battle Mountain Bugle, and Reno Gazette Journal. A scoping letter was also distributed to government agencies, organizations, and individuals. The formal scoping period officially began on March 2, 2007, when the NOI was published and closed on Friday, April 2, 2007. The NOI invited scoping comments to be sent to the BLM through April 6, 2007. Public scoping meetings for the Project were held on March 27 and 28, 2007.

The meeting on March 27, 2007, was held in Eureka, Nevada, at the Eureka Opera House. A total of five members of the public attended this meeting, and no written comments were received.

The meeting on March 28, 2007, was held in Battle Mountain, Nevada, at the BLM MLFO. A total of 30 members of the public attended this meeting, and one written comment was provided.

A total of six written public comments or letters were received by the BLM during the 30 day public scoping period. In addition, three letters were received three months after the close of the public comment period. A summary of the issues that were identified during scoping are summarized in Section 1.8 of this EIS.

5.2 Environmental Impact Statement Preparation

In preparing the EIS, the BLM communicated with and received input from federal, state, and local agencies, as well as private organizations and individuals. The following is a list of the agencies and private organizations that provided input:

Federal Government Agencies

United States Environmental Protection Agency
National Park Service
United States Fish and Wildlife Service

Tribes

On February 6, 2007, the MLFO mailed certified consultation initiation letters (Appendix F) to ten recognized tribal governments: Te-Moak Tribal Council; Elko Band Council; Wells Band Council; Battle Mountain Band Council; South Fork Band Council; Ely Shoshone Tribe; Duckwater Shoshone Tribe; Yomba Shoshone Tribe; Duck Valley Shoshone-Paiute Tribes; and the Timbisha Shoshone Tribe. Letters were also mailed to the Bureau of Indian Affairs, Eastern Nevada Agency, Western Shoshone Defense Project, and the Western Shoshone Committee of Duck Valley.

The MLFO also provided the services of an ethnographer to assist the BLM and tribal participants in identifying any specific traditional/cultural site, activity, and resource concerns. A list of the number of follow-up contacts with each recognized tribal government and organizations is presented in Table 5.2-1. The table in Appendix F provides the dates for these contacts.

Table 5.2-1: Number of Follow-up Contacts with Tribal Governments

Recognized Tribal Government / Organizations	Number of Contacts
Battle Mountain Band Council	3
Duckwater Shoshone Tribe	56
Elko Band Council	4
Ely Shoshone Tribe	4
South Fork Band Council	5
Te-Moak Tribal Council	2
Wells Band Council	5
Yomba Shoshone Tribe	4

State Government Agencies/Universities

Nevada Division of Forestry
Nevada Department of Wildlife
Nevada Natural Heritage Program
Nevada **Division** of Environmental Protection

Local Governments

Eureka County

Private Organizations

None currently identified.

5.3 Comments on the Draft EIS and Responses

5.3.1 Public Review Period

A 90-day public comment period for the Mount Hope Project Draft EIS commenced on December 2, 2011, with the publication of the Draft EIS Notice of Availability in the FR (Volume 76, No. 232, Friday, December 2, 2011, Page 75554). The public comment period ended on March 1, 2012.

Two public meetings were held for the Draft EIS. A meeting was held in Eureka on January 18, 2012, and a meeting was held in Crescent Valley on January 19, 2012.

A total of 195 people signed the sign-in sheets at the public meetings.

5.3.2 Public Comments

Agencies, organizations, and interested parties provided comments on the Draft EIS via mail, email, and oral comments at public meetings. The BLM received a total of 941 comment letters, emails, and oral comments during the public comment period. The breakdown of these by commenters is as follows:

- **Agency Comments**
  - **Federal agencies - 2**
  - **State agencies - 2**
  - **Local agencies - 5**
- **Tribal Comments - 1**
- **Organizations - 7**
- **Businesses - 94**
- **Individuals - 380**
- **Post cards/Form letters - 450**

Table 5.3-1 includes a list of all commenters.

Public comments and responses to public comments are included in Appendix H. Section 1.0 of Appendix H includes a list of all public comments received, as well as responses to all individual comments. Where the response to a public comment has been grouped with other similar comments, a grouped response is referenced.

Section 2.0 of Appendix H includes a list of all grouped responses. A CD is attached to the back of Volume III of the FEIS that includes all public letters, emails, and oral comments numbered. The CD also contains individual substantive or actionable comments that were identified in each letter, email, and oral comment with brackets in the text and numbers in the margin.

Table 5.3-1: Commenters on the Mount Hope Draft EIS

Letter Number	Commenter	Affiliation (if applicable)
1	Andrea and Doug Corley	
2	USA Citizen 1	USA Citizen Live
3	Jim Riley	
4	Stefan Cap	
5	Barney Johnson	
6	Seth Foreman	General Moly, Inc
7	Deborah Coulter	
8	Alan Edwards	
9	Peter Freeman	Cutfield Freeman & Co. Ltd.
10	Bob Vogels	
11	Dave Edwards	Tyco Flow Control – Mining Group
12	Johnny Ellis	Tyco Flow Control – Mining Group
13	Matt deLongchamps	Tyco Flow Control – Mining Group
14	Margie Ellis	
15	David Gambetta	TV&C Reno

Letter Number	Commenter	Affiliation (if applicable)
16	Wade Webster	Tyco Flow Control – Mining Group
17	Michael LaChance	Tyco Flow Control – Mining Group
18	Glen Inlow	
19	Keith Spaulding	Tyco Flow Control – Mining Group
20	John Ellis	Tyco Flow Control – Mining Group
21	Stephen Wilson	Marsh USA Inc.
22	Mark Compton	
23	Laura Skaer	
24	Sharon R. Byram	Ryan
25	Dave Naney	
26	Devon Downing	
27	Sergio Cattalani	
28	Danny Taylor	
29	Doug Parker	
30	Nolan Smith	
31	Philip Mulholland	
32	Lynne Volpi	
33	Frank Blair	
34	Jonathan Brown	
35	Richard Brown	
36	Tom Lewis	
37	Reed Lowe	
38	Kris McCaig	
39	John Schaff	
40	John Mastor	
41	Kalyn Galvez	
42	Joseph Kizis	
43	Joseph Laravie	
44	Joseph Greene	
45	Ken Cunningham	
46	Michael Smith	
47	Lorin Ottonello	
48	Brian Goss	
49	Keith Williams	
50	Stephen Antony	
51	Ta Li	
52	Ebrahim Tarshizi	
53	Mike Creek	
54	Robert Parker	
55	Debi Nelson	
56	Nance Card	
57	Jay Taylor	
58	Walter Martin	
59	John Klundt	
60	Dan DeLauder	
61	J.B. Pennington	
62	Gordon Sobering	
63	Jon Carpenter	
64	Arne Bakke	
65	Betty Gibbs	
66	Bill Rogers	
67	Jeremy Taylor	
68	Patricia Nelson	

Letter Number	Commenter	Affiliation (if applicable)
69	Chuck Zimmerman	
70	Val Gardner	
71	Kelly Sutherland	
72	Kimi Diaz	
73	William Rogers	
74	Andy Schumacher	
75	Sean Davis	
76	William Wahl	
77	Micheal Neumann	
78	Stefan Wenger	
79	Erik Novoa	
80	George Byers	
81	Debra Struhsacker	
82	Richard Bullock	
83	Thomas Callicrate	
84	Paula Russell	
85	Arthur Rogers	
86	NikKayla Simon	
87	Armando Edmiston	
88	Morris Kaufman	
89	Scott Harker	Comanco Environmental Corporation
90	Kris Jeremiah	
91	Robert C Schenk	
92	John Todd	
93	Ken Brook	
94	Quinn Westmoreland	
95	Keith Larsen	
96	John Welsh	
97	Shannon Thiss	
98	Jerry Zieg	
99	Richard Nielsen	
100	Joan Griffith	
101	Paul Marks	Comanco Environmental Corporation
102	Kenny Sanders	
103	William Ross	
104	SR Viert	
105	Roger Walher	
106	Larry Coon	
107	Dennis Dugal	
108	Jeffry Brumbach	
109	Catherine Clark	
110	David Szumigala	
111	Gregory Barth	
112	Alan Branham	
113	Paul Kaplan	
114	Dayan Anderson	
115	Christopher Rogers	
116	Norman Schwab	
117	Steve Rogers	
118	John R. Stoehr	Dyno Nobel Inc.
119	Chris W. Fleming	Smith Power Products
120	Steve Dorsa	
121	Sally McLeod	

Letter Number	Commenter	Affiliation (if applicable)
122	Don Robinson	
123	Zsolt Rosta	
124	Rober Pate	
125	Mike McDonald	
126	Leslie Creel	
127	David. Watson	
128	Ricahrd Reid	
129	John Duncan	
130	Bruce Arthur	
131	Gladys M. Porter	
132	Paul Sterk	
133	Dave Colburn	
134	Dave Clark	
135	Brian Libby	Comanco Environmental Corporation
136	Ralph Noyes	
137	Richard Lorson	
138	Lennie Boteilho	
139	Kathy Quick	
140	Chris Ennes	
141	Mark Thompson	
142	Brittany Scalabrin	
143	Terry Wampler	
144	Dustin Suhr	
145	Robert Breitling	PetroChem Inc.
146	Gary Pepka	
147	Joseph Boteilho	
148	Ben Suhr	
149	Matthew Nussbaumer	
150	Leo Mercy	
151	Tom Heneghan	
152	Scott Collier	Purcell Global Mining Group
153	Donna Bates	
154	Paul Heward	
155	Isabelle LaBranch	
156	Daniel Openshaw	
157	Dan Golden	
158	Jerry Danni	
159	Tony Marconato	Ledcor Contractors Inc.
160	Snyder Mechanical	Snyder Mechanical
161	Jed Inlow	
162	Bill Wright	Bill Wright Enterprises LLC
163	Robert Parker	Ames Construction, Inc.
164	Wayne & Maribeth Robinson	
165	Jeffrey Paddock	Peavine Construction, Inc.
166	Jean Fierro	Red Lodge Paralegal Services
167	Drew Fleming	Layton Construction Co.
168	Lance Semenko	Q & D Construction, Inc.
169	Randy Schwandt	Cate Equipment Company
170	George Ablah	Ablah Elko, LLC
171	Russ Harvey	Ames Construction, Inc.
172	George Burke	American Assay Laboratories
173	Norman L. Dianda	Q & D Construction, Inc.
174	Annette M. Gough	

Letter Number	Commenter	Affiliation (if applicable)
175	Mike Kummer	Granite Construction Incorporated
176	Mike Hawkins	Interstate Oil. Co.
177	Lee Raine	Raine's Market
178	James Worely	Ruby Mountain Realty & Appraisal Service
179	Claire Morrow	
180	Steve Peterson	
181	Troy Black	
182	Richard Walker	
183	Bradley Thomas	Ames Construction, Inc.
184	Dan Openshaw	Ames Construction, Inc.
185	Angie Negro-Black	
186	Blair Black	
187	Hunter Rosecrans	
188	Dustin Rockwell	Southeast Energy, LLC.
189	Sandy Spoo	
190	Jorden Rosecrans	
191	Tinker Evans	
192	Jeff Heinzen	Grove Madsen Industries
193	Gerey Dillinger	
194	Sherry Goodrich	
195	Donald Whitehead	
196	Truman Sharkey	
197	Kelly Jones	
198	Stephanie Foust	
199	Scott E. Brown	Cashman Equipment
200	Cory Robertson	Cashman Equipment
201	Randy Beck	Cashman Equipment
202	Ruth Haws	
203	Jared Williams	Cashman Equipment
204	Don Mitchell	
205	Kay Chaarpentier	Cashman Equipment
206	Troy Mickelsen	
207	Joe Colicchie	
208	Paul Roberts	
209	John Burrows	
210	Dale Archuleta	
211	Glenn Friederich	
212	Kim Boteilho	
213	Tabatha Teel	Cashman Equipment
214	Matthew Hoffer	
215	Ted Vernes	T Shar Enterprises
216	Pedro Ormaza	Ormaza Construction
217	Russ Fields	
218	Mike Holglund	Crescent Electric Supply Company
219	Roger Peterson	Utah Fabrication Inc.
220	Chris Johnson, Jim Conner, Jay Elquist, John Rice, and Rich Perry	Elko City Council
221	Steve Hansen	
222	Brian Campbell	Purcell Tire
223	Dorrman	
224	Brent Eldridge	

Letter Number	Commenter	Affiliation (if applicable)
225	Virginia Sanchez, Annette George-Harris, Ruby Sam, Alissa Thompson, Nye Penoli	Duckwater Shoshone Tribe
226	Joni Eastley	Nye County Commissioners
227	Kevin Doerr	IE Electric
228	Michael Scheiner	
229	Terrilynn Brown	
230	Dave Janiak	
231	Lennie Boteilho	Ames Construction, Inc.
232	Brad Patterson	
233	Lee Kreutzer	National Park Service
234	Hugh Alexander	
235	Sandra Powers	
236	Jim Motsinger	InterState Oil Company
237	Clark West	Agru America
238	Scott Raine	
239	Ted Antonioli	
240	Dave Cameron	
241	Jeremy Fuller	MMI Tank & Industrial Services
242	Ed Greer	
243	Cliff Eklund	City of Carlin
244	James Worely	Iron Age Metal Works
245	Steve Shappert	
246	Ronald Green	Corrosion Engineering, Inc.
247	Eric Bateman	Aggreko, LLC
248	Luke Spencer	
249	Ann Spencer	
250	Ursula Sindlinger	
251	Al Sindlinger	
252	Ginny Carano	
253	Molly Erwin	
254	James Ithurralde	
255	Tom Boyer	
256	Sue Orr	
257	Jeremy Deutsch	
258	Keith Van Vranken	H & E Equipment Services
259	Vickie Etchimek	
260	Fay Ward	
261	Melanie Branting	
262	David Barker	
263	Stefan Cap	
264	Ricahrd Persino	
265	Sabrina Reed	
266	Terrell Merrserly	
267	Mike Hill	
268	David Plummer	
269	Nancy Plummer	
270	Duane Hatch	
271	Robert Sellard	
272	Carla Ross	
273	James Sefton	
274	Hugh Ross	
275	Phillip Raz	

Letter Number	Commenter	Affiliation (if applicable)
276	Ryan Hope	GEM State Paper & Supply Co.
277	Mike Garrett	Marmon/Keystone Corporation
278	Italo Arias	
279	Wes Walker	
280	Frank Landt	
281	Tim Roybal	
282	Keith Jensen	
283	Dean Stone	
284	Keith Alexaner	
285	John Reilly	
286	Wedco	Wedco Inc.
287	Dana Selph	Olio Crane Group, LLC
288	Chris Wolford	
289	Willis Campbell	
290	Mike White	
291	David Hersh	
292	Robert Hanlon	Hanlon Engineering & Architecture, Inc.
293	Valerie Sawyer	Hanlon Engineering & Architecture, Inc.
294	William Assenmacher	CAID Industries
295	Margaret Sheen	
296	Stan Holek	
297	Randy and Shelly Rice	
298	Phil Schmitz	
299	Harry Coolidge	
300	Carol Schmitz	
301	Galen Schorsch	
302	Gary Odson	
303	S. Silveria	
304	John Kellerman	
305	Robert Riddle	
306	Dan Kellerman	
307	Chris Patterson	
308	Robert Joslin	
309	Terry Stewart	
310	Richard Weber	
311	Ben Zunino	Eureka County Schools
312	Gary Thurstin	
313	Thomas D. Toole	
314	Nicholas Harvey	
315	Diana Duncan-Elwess, Pam Borda, David Zornes	EDECA
316	Kenneth Justesen	
317	Jimmy Holliman	
318	Kenneth King	
319	Jim Tryon	
320	Lori Tryon	
321	R Earl Overholser	
322	Brenda Overholser	
323	Hunter Rosecrans	
324	Troy Black	
325	Angie Black	
326	Christina Turner	
327	Dennis Bawden	Structural Steel and Plate Fabrication

Letter Number	Commenter	Affiliation (if applicable)
328	Kendall Martin	Pony Express Deli
329	Curvin Martin	Pony Express Deli
330	Kendra Martin	Pony Express Deli
331	Jean Martin	Pony Express Deli
332	Tim Zasadny	
333	Mike Christianson	
334	Tom Boehnke	
335	Frank Pitman	
336	Stephen Oliver	Kaman Industrial Technologies Inc.
337	Stephen Oliver	
338	Gary Hansel	
339	Russ Fleming	
340	LeRoy Watson	
341	Patrick Lanier	
342	Thomas Buttram	
343	Paul Tsai	
344	Tom Jones	
345	Rory Anderson	
346	Phil Melick	
347	Doug Liu	
348	C Vaughan	
349	Eugene Mastin	
350	Jeff Barrett	
351	Mike Riley	
352	Kenneth Furnkranz	
353	Osama Omran	
354	Gordon Schaeffer	
355	Jerald Harris	
356	Darrell Daubert	
357	Bruce Groesbeck	
358	Rick Francom	
359	Skip Canfield	Nevada State Clearinghouse
360	Darcy Grizzle	Project Disbursement Group
361	Lisa Anne	
362	Michael Ahles	
363	Lloyd Morrison	
364	Dan Hamilton	
365	Thomas Shrecengost	
366	George Maniere	
367	Darin Galloway	Broadbent and Associates Inc.
368	John Etchegaray	
369	Fred Etchegaray	
370	Mary Jean Etchegaray	Farmer
371	Patricia Malensy	
372	Richard Wright	
373	Phllippe Blot	
374	Matti Kongas	
375	Robert McIvov	
376	David Taylor	
377	Robert and Sandy Johnston	
378	Alexandra Gallegos	
379	Julio Melgar	
380	Sarah Olson	

Letter Number	Commenter	Affiliation (if applicable)
381	Meredith Mackris	
382	Terry Tilley	
383	Laura Zumwalt	
384	Jim Baumann	
385	Debbie Coffey	
386	Marjatta Heinonen-Semenoff	
387	Eben Robinson	Southwest Energy, LLC
388	John R. Tripi, Jr.	Ames Construction, Inc.
389	Holly Propst	Western Business Roundtable
390	Monika Courtney	
391	Denise Cooksey	
392	Angie Friehauf	
393	Pamela Towne	
394	William Wellisch	
395	Terry Steinberger	
396	Nancy Kolowich	
397	Connie Cunningham	
398	Kathleen Gregg	
399	Phil Fell	Hamilton Solar
400	Steve Hamilton	Hamilton Solar
401	Julie Hudson	
402	Laurie McGegor	
403	Liro Schmidt	
404	Marianne Nana Betts	
405	Anne Pointer	
406	Arthur Giles	
407	LN	
408	Nick Cellini	
409	Katie Gillies	NDOW
410	Josh Gresham	
411	Ron Perry	
412	Barbara Urriola	
413	Doreen Jackson	
414	Steve Schoenbrow	
415	Mike Baxs	
416	Neal Jensen	
417	Nancy Iverson	
418	Richard Hersey	
419	Robert Gonzalez	
420	Chris Hassel	
421	Laura Dolan	
422	R.D. Schierman	
423	Raghoveer Thadisina	
424	Chris Pritcherd	
425	Tom Bolles	
426	Aaron Adkins	
427	Pavi Phillips	
428	Jordan Brough	
429	Seth Fredrick	
430	Jef Figveroa	
431	Leoa Punt	
432	James Delcoure	
433	Peschken	

Letter Number	Commenter	Affiliation (if applicable)
434	R. Leidermatt	
435	Micheal Gleason	
436	Jeff Bowman	
437	Jarrett Quinn	
438	Jorge Turrealba	
439	Megan Horst	
440	David Perkins	
441	Al Mortensen	
442	Matt Payne	
443	Jason Allen	
444	Karen Clarke	
445	Cal Caluaghan	
446	Mike Balloy	
447	Qiamg Yu	
448	Peter Dahlberg	
449	Tina Rahimign	
450	Larry Beckra	
451	Liz Arnold	
452	Don Jensen	
453	Kurt Keshimaki	
454	Tim Washburn	
455	James Leporge	
456	Tom Dalla Polu	
457	Chris Schauffek	
458	Tyson Gollaher	
459	Kerry Moffett	
460	Matt Fehr	
461	Grace Hinke	
462	Joe Galliher	
463	Bryan Watanabe	
464	John Barnes	
465	Lynn Marvin	
466	Karen Barnes	
467	Patrick Miller	
468	G. Fedechur	
469	Melissa Gregory	
470	Chuck Van Honten	
471	Mick Salliz	
472	Paul Meisburger	
473	Steve Sratete	
474	Steve Cattani	
475	Michael Orlich	
476	Guborm Brown	
477	Scott Hoenecke	
478	Eric Swanson	
479	Scott Shields	
480	Jim Byers	
481	GN Collins	
482	Dan Nower	
483	Juan Braud	
484	Lynne Volpi	
485	R. Mackelwar	
486	Eric Naquin	

Letter Number	Commenter	Affiliation (if applicable)
487	Ken Grishalen	
488	Nathan Lowe	
489	Debbie Richard	
490	Cindy LaRochelle	
491	Daniel Cameron	
492	Susan Poos	
493	Joh Cox	
494	Daniel Thompson	
495	William Rowe	
496	Cliff Krall	
497	Graham Ell	
498	Steve Nikolayer	
499	Ronald Peterson	
500	Carolyn Curley	
501	Ray Cheff	
502	Chris Icannakis	
503	Angela Gleichsner	
504	Pat Heywood	
505	Wayne Hawley	
506	Phil Pattern	
507	Rowl Chavez	
508	Erika Jordan	
509	Jodie Carnes	
510	Kathy Kreps	
511	Anthony Clark	
512	Tom Wood	
513	Tom Muraski	
514	Olufunsho Ogungbade	
515	Micheal Robins	
516	Dave Loring	
517	Mary Ann Gray	
518	Mathew Gray	
519	Mike Callahan	
520	Jim Kennedy	
521	W. Blackburn	
522	John Kurtsch	
523	Cindy Hamilton	
524	Eric Wanstrom	
525	Miguel Jahncke	
526	Joshua Divalenjro	
527	Tim Myers	
528	Vickie Hill	
529	Brian Jones	
530	Charles Staab	
531	Lisa Dealma	
532	Grant Smith	
533	Harry Donaldson	
534	Chris Adair	
535	David Johns	
536	Jason Guterez	
537	Tim Oliver	
538	Larry Bolton	
539	Shari Hurley	

Letter Number	Commenter	Affiliation (if applicable)
540	Jim Davis	
541	Heather Lawson	
542	Boyd Eisenbraun	
543	George Pruchnolski	
544	Brad Dunn	
545	David Keech	
546	Rick Mansigneur	
547	Paul Westerdale	
548	Manuela Boldini	
549	Edwin Peralta	
550	Neil Prenn	
551	Richard Barkey	
552	Pam Wilkinson	
553	William Wilkinson	
554	Kurt Rossbeager	
555	Corry Govmans	
556	Daniel Robertson	
557	Tom Breasnahan	
558	Scott Wsignan	
559	Brandy Chenoult	
560	Clayton Cross	
561	Brett Jackson Jr.	
662	Ben Gonzales	
563	Rod Hogton	
564	Drew Jenkins	
565	Laereco Aluqueique	
566	Chad Johnson	
567	Debra Evans	
568	Patrick Murphy, Kutta Radios	
569	Allen Douglas	
570	Melyssa McFarland	
571	Julian Collins	
572	Alan Frank	
573	Greg Zekoff	
574	Jeremy Kown	
575	Jason Lamb	
576	Buck Chamberlain	
577	Tim Tebbe	
578	David Milroy	
579	Paul McCarthy	
580	David Pitchford	
581	Dick Sutherland	
582	Sarah Racolta	
583	Bill Watenburg	
584	Shawn Steiner	
585	Wendy Capron	
586	Clayton Thayer	
587	Bob Snyder	
588	Peter Lawsen	
589	Jay McCloskey	
590	Gary Wyss	
591	James Kruger	
592	Thomas Camm	

Letter Number	Commenter	Affiliation (if applicable)
593	Kevin Kennedy	
594	JW Holmes	
595	Dan Howell	
596	Dustin Baker	
597	Jodi Bakon	
598	Vickie Hill	
599	Glenn Mann	
600	Kevin Torpy	
601	Stephan Marin	
602	Toby Clark	
603	Randy Stroop	
604	Sarah Perno	
605	Phil Dalke	
606	Emily Wunder	
607	Clint Welch	
608	J. Chris Pfahl	
609	Alex Deeds	
610	Joh Morris	
611	Lane Maloney	
612	Daray Dalamore	
613	Chris Snow	
614	Stanley Krukowski	
615	Ben McKnight	
616	Sean Gagnin	
617	Tammy Jacobs	
618	L. Carperton	
619	Megan Russell	
620	Todd Sams	
621	Michael Kresl	
622	Kevin Steff	
623	Ron Gundy	
624	Shary Emdy	
625	Dajerie Broedway	
626	Helm Roy	
627	Dave Strahorm	
628	Ernesto Rogus R.	
629	Matt Van Alsbml	
630	Sandra Kunkel	
631	Kevin Kunkel	
632	Jim Barlow	
633	Eric Smith	
634	Chan Milhon	
635	Jarek Drelidy	
636	Chris Wollington	
637	Chuck Gold	
638	Rick Van Buger	
639	Dennis Huckler	
640	LuAnne Bender	
641	Tom Bender	
642	Robert Wingly	
643	Jessica Miller	
644	Jason Felsman	
645	Kim Monett	

Letter Number	Commenter	Affiliation (if applicable)
646	Matt McGarry	
647	Jim Wickens	
648	Bill Perren	
649	Steve Crotty	
650	J. Williams	
651	Kimberly Ng	
652	Frank Traczyk	
653	Steve Tang	
654	Karl Zipe	
655	Carl Spang	
656	Andrea Cocergine	
657	Robyn Fisher	
658	Jav Carranza	
659	Nev Judd	
660	Genevieve Bodnar	
661	Richard Meston	
662	Louis Fernando Arana Florer	
663	Joe Dzrezina	
664	Todd Hollingsworth	
665	Asa Weber	
666	Bill Jacks	
667	Craig McDonald	
668	Tom Bobo	
669	Brain Nortan	
670	Christian Rodriguez Silva	
671	Tom Strombotno	
672	Jeff Franice	
673	Jim Metsa	
674	Lee Brammer	
675	Bob Harris	
676	Mike Edmonds	
677	Paul Feeney	
678	Doug Kuwie	
679	John K Griffith	
680	John Cook	
681	Retti Aguica	
682	Les Naday	
683	Nguyen Do	
684	Alex Scism	
685	Doug Lavin	
686	Scott Schille	
687	Joanna Peck	
688	Nicole Gust	
689	Matt FaBramer	
690	Elizabeth LaBranch	
691	John Tierney	
692	Lane Griffin	
693	Christine Behnke	
694	Kathryn Kosloski	
695	Brett Schug	
696	Mike Dennis	
697	Matt Parkkin	
698	Ken Smith	

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699	George Edminston	
700	Jans Srandemp	
701	John Krehea	
702	Todd Videlock	
703	Kaithlin Brovksy	
704	Bob Clark	
705	Charles Maes	
706	Daniel Steuber	
707	SA Ravishankar	
708	Pete Tetlow	
709	Michael White	
710	Tom Bailey	
711	Jackie Tresedder	
712	Alex Schloemes	
713	Tim Warden	
714	Calib Warden	
715	Mark Jamyochian	
716	Sheridon Shumway	
717	Rick Romney	
718	Scott McLellan	
719	Jonathon Rowland	
720	John Newmiester	
721	Barney Etzer	
722	Suha Aksoy	
723	Roger Bond	
724	Pete Niemann	
725	Thomas Witt	
726	Jim Brown	
727	Breaker Technology, LTD	
728	Danette Ruhe	
729	Adrian Deneys	
730	Brad Kendwich	
731	David Heckendorn	
732	Jason Jihastone	
733	John Campball	
734	Ron Babich	
735	Gary Ritter	
736	Alex Jareb	
737	H. Fraser Bringeland	
738	Francisco Benayides	
739	Jorge Lerena	
740	Luszalo Bencze	
741	Louis Primak	
742	Leo Weiman	
743	Bahareh Arabzadeh	
744	Bismark Osei	
745	Daniel Arku	
746	Kathleen Tew	
747	Nick Culbreth	
748	Gop Bylanpodi	
749	Rebecca Bickal	
750	Megan Bickal	
751	Candy Mihilas	

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752	Danizth Larsa	
753	Damon Cochrane	
754	Zack Fairblacks	
755	Dan Boden	
756	Tom Lepak	
757	Bob Hibus	
758	Mike Haywood	
759	Jennifer Leinart	
760	Colt Everly	
761	Camille Prenn	
762	Cecil Urlich	
763	Catherine Lao	
764	Michael Devin	
765	Kenneth Griffin	
766	Randy Kammadal	
767	David Miller	
768	Joe Poplawski	
769	Edmund Jong	
770	Eric Chevey	
771	Ron Woolf	
772	Mike Kelly	
773	Mike Dryden	
774	Kenny Sherrill	
775	Sole Bode	
776	Steven Newman	
777	Mikayla Bowers	
778	Julie Wallace	
779	Jason Wilson	
780	Kent Lang	
781	Ed Diekman	
782	Christine Parkens	
783	Ashok Amin	
784	Louis Boone	
785	Steve Page	
786	Nicole Lanzel	
787	Tom Wayrengl	
788	Loel Renshaw	
789	Matt Donovan	
790	Dana Renshaw	
791	David Moore	
792	Bobby R Peek	
793	Thea Miller	
794	Erikka Purnell	
795	Anthony Sendek	
796	Ken Conley	Conley Land & Livestock, LLC
797	Rebecca Ratcliff	
798	Sophia Peranteau	
799	Marilyn Wilson	
800	Tim Swendsied	
801	Lisa Norman	
802	Marty Plaskett	Diamond Valley Hay Company
803	Leonard Fiorenzi, Mike Page, J.P. Ithurralde	Eureka County Board of Commissioners

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804	Jette Seal	
805	Carolyn Bailey	
806	Wolfgang Baum	
807	Ryan Tilstia	
808	Kollene Schwartz	
809	Lelio Gallo	
810	Sean Martinez	Modular Mining Systems, Inc.
811	Jim Collord	
812	Jeff Thompson	Codale Electric Supply, Inc.
813	Patrick Rogers	Eureka Moly, Inc.
814	Jared Webley	
815	Luke Russell	
816	Roger and Judy Allen	
817	Jeffrey Bell	
818	John Burrows	
819	Cat Kindsfather	
820	Kathleen Bailey	
821	Erron Boes	
822	Tom Day	Interstate Safety & Supply, Inc.
823	Mark Moyle, Vickie Buchanan, Marty Plaskett, Tim Bailey, Fred Etchegaray, Ken Conley, Jerry Sestanovich, Jim Bauman, Lloyd Morrison	Mark Moyle Farms LLC
824	Mark Moyle, Vickie Buchanan, Marty Plaskett, Tim Bailey, Fred Etchegaray, Ken Conley, Jerry Sestanovich, Jim Bauman, Lloyd Morrison	Diamond Natural Resources Protection and Conservation Association
824	Fabreeka - Nay Ham	
826	Gabriel Screst	
827	Larry McHugh	
828	Art Dorado	
829	Jesus Figureroa	
830	Sherry Gaddy	
831	Ronald Parratt	
832	Dennis Gaddy II	
833	Eric Struhsacker	
834	Sherry Oster	
835	Craig Downer	
836	Donald Palmore	
837	Annette McFarland	
838	Katie Fite	Western Watersheds
839	Rhonda Lanier	
840	Christi Fagerstone	
841	Cornelia Relyea	
842	Connie Sablan, James Stephens, Alex Deeds, Jon Morris, Jason Musso, Connie Sablan, Rhonda Shelton, Nick Korolsky	National Exploration
843	Lena Funston	
844	Jan Chudosky	
845	Lisa Griffith	

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846	James Maronick	
847	Deborah Hurley	
848	Kate Bremer	
849	Kate Bremer	
850	Paula Denmon	
851	Leslie Peeples	
852	Tami Crisanti	
853	Eileen Hennessy	
854	Lana Verplank	
855	Jack Alexander, Martin Etcheverry	Diamond Cattle Company
856	Laura Skaer	NWMA
857	Rob Pliskin	
858	John Hadder	Great Basin Resource Watch
859	Tara Jackson, Martin Etcheverry,	Etcheverry Family LTD
860	Gayle-Suzanne Barron	
861	Laura Leigh	
862	Linda Horn	
863	Les Davies	
864	Marybeth Devlin	
865	Elyse Gardner	
866	Michael Dwyer	DXP Enterprises
867	Richard Carlgren	BP Limited
868	Thom Seal	
869	Betsey Barker	
870	Mat Wong	
871	Ronald Woodworth	
872	Bob Dinwiddie	
873	Bobbie Dinwiddie	
874	Mike Laughlin	
875	James Eaton	
876	Richard Landers	
877	PJ Benet-Davis	
878	Jean Fierro	
879	Anthony Rowley	
880	Mary Zunino	
881	Lawrence Mohler	
882	Nancy Gray	
883	Lisa Bennett	
884	Bernard Pacheco	
885	Ken Conley	
886	Gerey Dillinger	
887	Mike Lortie	
888	John McHahen	
889	Nate Garner	
890	Richard Carlgren	
891	Roger Osmun	
892	Deon Reynolds	
893	Dustin Weilder	
894	Steve Cook	
895	Cody Dalton	
896	Val Sawyer	
897	Donald Heuser	
898	Zach Spencer	

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899	Larson Bills	
900	Trish Reynolds	
901	Jared Fitzwater	
902	Maribeth	
903	Bob Burnham	
904	Steve Drimmer	
905	Eric Williams	
906	Mark Moyle	
907	Jake Tibbitts	
908	Dale Bugenig	
909	Scott Raine	
910	Lennie Boteilho	
911	Mike Innacchione	
912	Tony Araguistain	
913	Ken Conley	
914	Kevin Conley	
915	Fred Zumwelt	
916	Sarge Warick	
917	Annette George Harris	
918	Todd Gilligan	
919	John Colby	
920	Carrie Dubray	
921	Bruce Hansell	
922	Jacobsen Construction	
923	Carri Wright	
924	Doug Elder	
925	Paul Heward	
926	Don Smales	
927	Bart Hiatt	
928	Dale Bugenig	
929	Bob Pennington	
930	John Curry	
931	Jake Tibbitts	
932	Bob Harper	
933	Unknown	
934	Pat Dempsey	
935	Gerey Dillinger	
936	Dina Forst	
937	John Andress	
938	Gus Harvey	
939	Randy Rice	
940	Paul Heward	
941	Jared Blumenfeld	Environmental Protection Agency

5.4 Final Environmental Impact Statement Distribution

First Name	Last Name	Company
		American Horse Protection Assoc.
Cathy	Barcomb	Animal Rescue Network International

First Name	Last Name	Company
Mike	Price, Chair	Battle Mountain Band Council
Craig	Roa, Vice Chair	Battle Mountain Band Council
Joseph G.	McDade-Superintendent	BIA-Eastern Nevada Agency
Athena	Brown, Superintendent	Bureau of Indian Affairs, Western NV Agency
Rosemary	Thomas, District Manager	Bureau of Land Management
Kenneth	Miller, District Manager	Bureau of Land Management
Chris	McAlear, District Manager	Bureau of Land Management
Gene	Seidlitz, District Manager	Bureau of Land Management
Mary Jo	Rugwell, District Manager	Bureau of Land Management
Amy	Lueders, State Director	Bureau of Land Management, NV State Office
Kenneth	Parr	Bureau of Reclamation
Rob	Mrowka	Center for Biological Diversity
Joan	Whitney	Cortez Gold Mine Tribal Liaison
Mark & Martin	Etcheverry	Diamond Cattle Co.
Maurice	Frank Churchill	Duckwater Shoshone Tribe
Annette	George-Harris	Duckwater Shoshone Tribe
Virginia	Sanchez, Chair	Duckwater Shoshone Tribe
Alfreda	Jake	Elko Band Council
Gerald	Temoke, Chair	Elko Band Council
Alvin	Marques, Chair	Ely Shoshone Tribe
Mark	Richards	Ely Shoshone Tribe
Opal	Adams	Enviroscientists, Inc.
Richard F.	DeLong	Enviroscientists, Inc.
Jim	Baumann	Eureka County Dept. of Natural Resources
Chad	Bliss	Eureka County Dept. of Natural Resources
Ken	Conley	Eureka County Dept. of Natural Resources
Leo	Damele	Eureka County Dept. of Natural Resources
Carrie	Dubray	Eureka County Dept. of Natural Resources
Jake	Tibbitts	Eureka County Dept. of Natural Resources

First Name	Last Name	Company
Jerry	Todd	Eureka County Dept. of Natural Resources
Jim	Wise	Eureka County Dept. of Natural Resources
Jim	Etcheverry	Eureka Livestock Co.
Kevin	Kinsella	Eureka Moly, LLC
Sharon	Netherton, Executive Director	Friends of Nevada Wilderness
Gary	Snow	Gary Snow Livestock and Grain
Michael K.	Branstetter	General Moly Inc.
		Great Basin Resource Watch
Kristi	McKinnon	JBR Environmental Consultants, Inc.
Pete	Tomera	Julian Tomera Ranches, Inc.
Joy	Brandt	Lander Co PLUAC
Ray	Salisbury	Lander Co PLUAC
Frank	Whitman	Lander Co PLUAC
Philip	Williams, Vice Chairman	Lander Co PLUAC
Louis	Lani	Lander Co. Wildlife, PLUAC, Planning, HRBWA
Gene	Etcheverry	Lander County Executive Director
Alan	Gubanich	LAS Acting President
Ted	Melsheimer	McLeod Ranch & Fishery
Henry	Filippini Jr.	N6 Board
		National Mustang Association
D. Bradford	Hardenbrook, Supervisory Biologist	NDOW
Steve	Cooke, Environmental Services	Nevada Department of Transportaion
Tracy	Kipke	Nevada Department of Wildlife
Alan	Jenne	Nevada Department of Wildlife
Mike	Podborny	Nevada Department of Wildlife
Dave	Pulliam	Nevada Department of Wildlife
Robert	Williams	Nevada Fish and Wildlife Office
David	Buhlig	Nevada Land and Resource Company
Henry	Krenka	Nevada Outfitter & Guide Association
Krista	Coulter	Nevada State Clearing House

First Name	Last Name	Company
Lee	Simpkins	NV Energy
John	McLain	Resource Concepts, Inc.
		Rodeo Creek Gold Inc.
Robert	Bear	Shoshone-Paiute Tribes of the Duck Valley Indian Reservation
Ted	Howard	Shoshone-Paiute Tribes of the Duck Valley Indian Reservation
Sim	Malotte, Chair	South Fork Band Council
Marla	Woods	South Fork Band Council
Warner	Barlese, Chair	Summit Lake Paiute Tribe
Ron	Johnny	Summit Lake Paiute Tribe
Richard	Orr	Sustainable Grazing Coalation
Daniel	Petterson, Director	SW PEER
Jack	Alexander	Synergy Resource Solutions, Inc.
Bryan	Cassadore, Chair	Te-Moak Tribal Council
Pat	Stevens	Te-Moak Tribal Council
Makendra	Silverman	The Cloud Foundation
Barbara	Durham	Timbisha Shoshone Tribe
George	Gholson Chair	Timbisha Shoshone Tribe
Steve	Williams, District Ranger	USFS, Austin Ranger District
Aurora	Aboite	Wells Band Council
Paula	Salazar, Chair	Wells Band Council
Deb	Blossom	Western Shoshone Committee
Carrie	Dann	Western Shoshone Defense Project
Katie	Fite, WWP Biodiversity Director	Western Watersheds Project
Dawn	Lappin	Wild Horses Organized Assistance
James	Birchim, Chair	Yomba Shoshone Tribe
Teola	Brady	Yomba Shoshone Tribe
Mark	Bennett	
Steven	Carter	
Alan	Coyner	
Leo	Damele	
Norma	Darrough	
Craig	Downer	
Ellen	Gardner	
Kelly	Hoekenga	
Stanley	Hooper	

First Name	Last Name	Company
James	Ithurralde	
James	Kuipers	
Cindy	MacDonald	
Paul	Mattinen	
Bobby	Peek	
Marjorie	Sill	
Mike & Barb	Stremler	
Kimberly	Wolf	
Baumann Family Trust		
Anthony	Carone	
Alan	Chamberlain, Ph.D.	Cedar Strat Corp.
Debbie	Coffey	
Neal	Tharpe	
Patrick	Plumley	
Carolyn	Bailey	
Representative Shelley	Berkley	
Representative Joe	Heck	
Miles	Shaw	Bureau of Mining & Reclamation - NDEP
Carter	Jessop	US EPA Region IX
Chairperson		Bridgeport Indian Colony
Tim	Arnold	
D.J.	Schulbert	Animal Welfare Institute
Deniz	Bolbol	American Wild Horse Preservation Campagin
Lee	Kreutzer	National Park Service
Lisa	Wolf	
Daniel	Rudnick	
Catherine	Clark	
		Shroeder Law Offices
Jim	Gallagher	
Bob	Burnham	
Ken	Conley	
JJ	Goicoechea	
Andrew	Marshall	
Christine	Smith	
Lee	Raine	
Lloyd	Morrison	
Tim	Bailey	
Rex	Massey	
Dale	Bugenig	
Kirk	Winges	

First Name	Last Name	Company
Senator Dean	Heller	
Senator Harry	Reid	

5.5 List of Preparers

5.5.1 Bureau of Land Management EIS Team

Resource/Responsibility	BLM Team Member	Degree and Experience	BLM Office Location
BLM Project Lead, NEPA Compliance, Environmental Justice	Angelica Rose	A.S. General Studies B.S. Environmental Studies emphasis Geography 8 years experience	Battle Mountain District Office
BLM Project Lead, NEPA Compliance, Environmental Justice	**Gloria Tibbetts**	**M.P.A.** **B.A. Environmental Studies** **5 years experience**	**Battle Mountain District Office**
Cultural Resources, Paleontology	Teresa Dixon	B. A. Archaeology 11 years of experience	Battle Mountain District Office
Native American Traditional Values, Consultation	Gerald Dixon	B.S. Cultural Anthropology 13 years experience	Battle Mountain District Office
Native American Traditional Values	**Tim Coward**	**30 years experience**	**Battle Mountain District Office**
Lands and Realty	Charles Lane	M.S. Geology B.S. Geology 31 years experience	Battle Mountain District Office
Recreation, Wilderness, Visual Resources	Todd Neville	B.S. Psychology, Minor Recreation M.B.A. Business Administration 11 years experience	Battle Mountain District Office
Recreation, Wilderness, Visual Resources	**Ethan Arky**	**B.S. Recreation, Park, and Leisure Studies** **1 year experience**	**Battle Mountain District Office**
Livestock Grazing and Production, Vegetation, Soils	**Ashley Johnson**	B.S. Rangeland Ecosystem Science 3+ years experience	Battle Mountain District Office
Livestock Grazing and Production, Vegetation, Soils	**Jason Spence**	**B.S. Rangeland Resources emphasis in Management; Minor in Crop and Soil Science** **12 years experience**	**Battle Mountain District Office**
Hydrology	Jon Sherve	M.S. Hydrology/Hydrogeology B.A. Biological Sciences 15 years experience	Battle Mountain District Office
Hydrology	Tom Olsen	Ph.D. Geology, Engineering 27 years experience	Nevada State Office

Resource/Responsibility	BLM Team Member	Degree and Experience	BLM Office Location
Forest **Products**, Migratory Birds, Threatened and Endangered Species, Wildlife, **Floodplains**	Ryan Sandefur	M.S. Applied Natural Science B.S. Biology 10 years experience	Battle Mountain District Office
Forest Products, Migratory Birds, Threatened and Endangered Species, Wildlife	**Ethan Ellsworth**	**Ph.D. Wildlife Resources** **20 years experience**	**Battle Mountain District Office**
Wild Horses	Shawna Richardson	B.S. Natural Resource Science with emphasis in Range Management 18 years experience	Battle Mountain District Office
Air Resources	Craig Nicholls	B.S. in Atmospheric Sciences and an M.S. in Atmospheric Sciences 22 years of experience	National Operations Center
Socioeconomics	Joshua Sidon	Ph.D. Economics 5 years experience	National Operations Center
Geographic Information System	Kathy Graham	B.S. Wildlife Management 14 years experience	Battle Mountain District Office
Environmental Coordinator	Christopher Worthington	B.S. Forestry **28** years experience	Battle Mountain District Office
Noxious Weeds, Invasive and Nonnative Species	Michael Vermeys	B.A. Biology 15 years experience	Battle Mountain District Office
3809 Project Lead	**Joseph Moskiewicz**	**A.S. Forestry** **B.S. Agriculture emphasis Natural Resources** **38 years experience**	**Battle Mountain District Office**
Mining Engineer	Larry Turner	B.S. Mining Engineering 30 years experience	Battle Mountain District Office

5.5.2 Third Party EIS Contractor - Enviroscientists, Inc.

Resource/Responsibility	Enviroscientists, Inc. Team Member	Degree and Experience
Project Manager, Land Use Authorizations and Access, Hazardous Materials, Historic Trails, Hydrology, Geochemistry, Native American Traditional Values, Environmental Justice, Cumulative Analysis	Richard DeLong	M.S. Geology M.S. Resource Management B.A. Geology 25 years experience
Geology and Mineral Resources, Visual Resources, Photosimulations, Editor	Opal Adams	M.S. Geology B.S. Geology 30 years experience

Resource/Responsibility	Enviroscientists, Inc. Team Member	Degree and Experience
Assistant Project Manager, Vegetation Resources, Invasive Nonnative Species, Wetlands and Riparian Zones, Livestock Grazing and Production, Wild Horses, Wildlife, Forest Products	Michele Lefebvre	Ph.D. Biology **B.A. Biology** 7 years experience
Soils	Kaitlin Sweet	B.S. Hydrogeology 2 years experience
Geographic Information Systems	Gail Liebler	M.S. Geosciences B.A. Geology 15 years experience
Technical Support	**Nick Mitrovich**	**M.S. Natural Resource Management** **B.A. Environmental Studies/Policy** **1 year experience**
Socioeconomics	**Catherine Lee**	**M.A. Geography** **B.S. Geography** **11 years experience**
Auditory Resources (Subconsultant – Brown Buntin Association)	Jim Buntin	B.A. Zoology Board Certification – Noise Control Engineering 38 years experience
Hydrology (Subconsultant – Hydrologic Consultants, Inc.)	Dan Stone	Ph.D. Geophysics B.A. Geology and Physics 21 years experience
Geochemistry (Subconsultant – Integral Consulting, Inc.)	Andrew Nicholson	Ph.D. Geochemistry B.S. Geology 22 years of experience
Ecological Risk (Subconsultant – Integral Consulting, Inc.)	Jennifer Sampson	M.S. Fisheries Certified Senior Ecologist 20 years experience
Cultural Resources (Subconsultant – Western Cultural Resource Management)	Ed Stoner	M.A. Anthropology 26 years experience
Cultural Resources (Subconsultant – Western Cultural Resource Management)	Collette Chambellan	M.A. Anthropology 35 years experience
Native American Traditional Concerns (Subconsultant – ASM Affiliates, Inc.)	Molly Molenaar	M.A. Anthropology B.A. English 10 years experience

5.5.3 Cooperating Agencies

The following table lists the Cooperating Agencies, the associated individuals if applicable, and their qualifications.

Agency	Name	Degree and Experience
Nevada Department of Wildlife	Katie Miller	M.S. Biology B.S. Wildlife Resources 10 years experience
Nevada Department of Wildlife	**Alan Jenne**	B.S. Wildlife Management 19 years experience
Eureka County	Eureka County Board of Commissioners Lenny Fiorenzi, Jim Ithurralde, and Mike Page) Eureka County elected and appointed officials. Eureka County Community NEPA Committee (Jim Gallagher, Christine Smith, Andy Marshall, Lloyd Morrison, Lee Raine, Ken Conley, Tim Bailey, J.J. Goicoechea, and Bob Burnham Jake Tibbitts	 M.S. Geographic Information Science- Geospatial Rangeland B.S. Biology 7 years experience
National Park Service	Lee Kreutzer	Ph.D. Archaeology M.A. Archaeology B.A. Anthropology B.A. Communications 28 years experience

5.5.4 Other Information Contributors

The following table lists the organizations, the associated individuals, and their qualifications that assisted Eureka County in their review of the EIS.

Organization	Name	Degree and Experience
Abigail C. Johnson Consulting (NEPA process, community involvement, socioeconomics)	Abigail Johnson	B.A. Political Science and Philosophy 30 years experience

Organization	Name	Degree and Experience
RCS, Inc. (socioeconomics)	Rex Massey	B.A. Mathematics B.A. Economics MBA 24 years experience
Dale C. Bugenig Consulting Hydrogeologist, LLC (hydrogeology and water modeling)	Dale Bugenig	M.S. Hydrology and Hydrogeology B.A. Geology 32 years experience
Lahontan Geosciences, Inc. (hydrogeology and water modeling)	Carol Oberholtzer	M.S. Hydrogeology B.A. Earth Sciences 20 years experience
Hanlon Engineering (mine engineering and water use)	Randy Powell (currently employed by Tetra Tech)	B.S. Metallurgical Engineering 36 years experience
Walker & Associates (natural resources)	Steve Walker	B.S. Agriculture and Range Management 33 years experience
Tri Sage Consulting (fisheries biology and natural resources)	Lori Williams	B.S. Chemical Engineering 30 years experience
Chinook Engineering (fisheries biology)	Jay Kidder	B.S. Fisheries Biology B.S. Civil Engineering 27 years experience
Environ (air quality)	Kirk Winges	M.S. Chemical Engineering B.S. Earth and Planetary Science 30 years experience

6 REFERENCES AND GLOSSARY

6.1 References

Air Sciences Inc. 2010. *NEPA Impact Analysis. Mount Hope Project*. Prepared for Eureka Moly LLC.

_____. 2011a. *Mt. Hope Project: NO_2 1-Hour NAAQS Compliance*. Prepared for Eureka Moly LLC. March 2011.

_____. 2011b. *Mt. Hope Project: SO_2 1-Hour NAAQS Compliance*. Prepared for Eureka Moly LLC. March 2011.

_____. 2011c. *Mt. Hope Project: Employee Transport Bus Emissions*. Prepared for Eureka Moly LLC. January 2011.

_____. 2012a. *NEPA Air Quality Impact Analysis. Mount Hope Project.* Prepared for Eureka Moly LLC. March 2012.

_____. 2012b. *NEPA Air Quality Impact Analysis, Addendum, Hazardous Air Pollutants Analysis.* Prepared for Eureka Moly LLC. March 2012.

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6.2 Glossary

Acid Generating Potential (AGP) - The amount of acid-producing constituents in a given material. For rock material, the total sulfur concentration is determined, assumed to be reactive sulfide, and reported in terms of calcium carbonate equivalent per mass of material.

Acre-Foot - Volume of water covering one acre one-foot deep; equal to 325,900 gallons.

Adit - A horizontal passage leading into a mine for the purposes of access or drainage.

Alluvial Fan - A low, outspread, relatively flat to gently sloping mass of loose rock material, shaped like an open fan or a segment of a cone, deposited by a stream.

Animal Unit Month (AUM) - The amount of forage **necessary for the sustenance of one cow or its equivalent for a period of one month**.

Annual Duty - The maximum permitted volume of water which may be pumped yearly from a water right or from a designated hydrographic basin.

Appropriate Management Level (AML) - The number of adult horses or burros (expressed as a range with an upper and lower limit) to be managed within an herd management area Forage for wild horse and burro (AUMs) is allocated based on the AML upper limit.

Aquifer - A water-bearing, subsurface geologic deposit that may be composed either of rock or of unconsolidated sediments such as alluvium.

Authorized Officer - Any employee of the BLM to whom authority has been delegated to perform the duties described in BLM Manual 1203 Delegation of Authority.

Backfilling - With reference to waste rock, it is the relocation of waste rock for final disposition from a waste rock dump located outside of the open pit into the open pit.

Beneficial Use - The use of water for any purpose for which benefits are derived, such as for irrigation, hydroelectric power, and industrial and domestic uses. Benefits vary with locality and custom, and what constitutes beneficial use is often defined by statute or by court decision.

Diversion Rate - The maximum permitted rate at which water may be pumped from a designated hydrographic basin.

Drift - A near-horizontal passageway in a mine, following a vein of ore.

Emergency - An unexpected event that threatens the health and welfare of a wild horse and burro population and/or or its habitat. Examples include fire, insect infestation, disease, or other events of a catastrophic and unanticipated nature.

Ephemeral Stream - A stream channel that carries water only during and immediately after periods of rainfall or snowmelt.

Evapotranspiration - Discharge of water from the earth's surface into the atmosphere by transpiration by plants during growth and by evaporation from the soil, lakes, and streams.

Excess Animals - Wild, free-roaming horses or burros that have been removed or which must be removed from the public lands in order to preserve and maintain a thriving natural ecological balance and multiple-use relationship in an area.

Fertility Control - A tool to decrease fertility and which, when implemented, reduces (slows) population growth rates and extends the gather cycle.

Head - The height of a column of fluid necessary to develop specific pressure. Also known as pressure head.

Herd - One or more stallions and their mares and foals.

Herd Area (HA) - Geographic area of the public lands identified as habitat used by wild horses and burros at the time the Wild and Free Roaming Horses and Burros Act was enacted (12/15/1971).

Herd Management Area (HMA) - May be established in those HAs within which wild horses and burros can be managed for the long term. HMAs are designated through the land use plan process for the H-4700-1 Wild Horses and Burro Management Handbook (public) BLM Handbook – 58 – Rel. 4-116 07/07/2010.

Hydraulic Conductivity - A measure of the characteristics of a unit area of an aquifer to allow water to flow through it, frequently expressed as feet per day.

Hydraulic Gradient - The change in the elevation of the water level in an aquifer over a given distance, expressed either as feet per feet or as a dimensionless number.

Hydraulic Head - The height of the free surface of a body of water above a given point beneath the surface.

Intermittent Stream - A stream which flows part of the year, as when fed by runoff or spring flow.

Land Use Plan (LUP) - LUPs provide (by tracts or areas) for the use of public lands. LUPs are prepared in accordance with established land use planning procedures in 43 CFR 1600 and pursuant to Federal Land Policy and Management Act. They establish goals and objectives (desired outcomes), identify the management actions needed to achieve the desired outcomes, and identify the allowable uses of the public lands.

Minimal Feasible Level of Management - The minimum number of habitat or population management tools or actions necessary to attain the objectives identified in approved land use plans and herd management area plans for a herd management area or herd management area complex.

Monitoring - The process of collecting and analyzing the data necessary to evaluate existing management and determine whether progress is being made toward attaining established habitat and population management goals and objectives.

Net Neutralizing Potential (NNP) - The net amount of alkaline or basic constituents in a given material minus acid generating material, or ANP-AGP=NNP. Reported in terms of the equivalent mass of calcium carbonate per mass of material.

Neutralizing Potential (NP) - The amount of alkaline or basic constituents in a given material. The capacity of this material to neutralize acidity is determined and reported in terms of the equivalent mass of calcium carbonate per mass of material.

Open stope - Underground working place that is unsupported, or supported by timbers or pillars of rock.

Oxidized Ore - Mineralized rock that is comprised predominantly of oxidized or weathered rock types and is of sufficient economic value to justify mining and recovery costs.

Perched Ground Water - Ground water separated from an underlying body of ground water by an unsaturated zone of soil or rock.

Perennial Stream - A stream or reach of a stream that flows continuously throughout the year and whose upper surface is generally lower than the water table in the region adjoining the stream.

Phreatophytes - Plants **(including, but not limited to, greasewood, rabbitbrush, saltgrass in the Project Area)** whose root systems tap into the water table.

Playa - A vegetation-free, flat-floored area composed of thin, evenly stratified sheets of fine clay, silt or sand, and representing the bottom part of a valley, completely closed or undrained, desert lake basin in which water accumulates and is quickly evaporated. Low-lying central area of an arid plain in which water collects and is evaporated after a period of surface runoff.

Population Growth Rates - Represent the net effect of births and deaths in any given year. The BLM reports annual population numbers as of February 28th.

Porosity - The volume of open space between sand grains or in fractures through which ground water may flow; usually expressed as a percentage.

Project Area - The area within which EML proposes to conduct the activities associated with the Project, and is described as all or part of, Township 20 North, Range 50 East, Sections 2-5, (T20N, R50E, Secs. 2-5); T20N, R52E, Secs. 5, 8, 9, 16, 21, 26-28, 34-36; T20N, R53E, Secs. 31-35; T21N, R50E, Secs. 1-3, 11-14, 23, 25, 26, 32-36; T21N, R51E, Secs. 1, 7, 8, 12, 16-18, **31**; T21N, R52E, Secs. 4-9, 18-20, 29, 32; T21½N, R51½E, All; T21½N, R52E, Secs. **4-6**; T22N, R50E, Secs. **25**, 36; T22N, R51E, Secs. 1, 2, 11-15, 20-**26, 28**-36; T22N, R51½E, All; T22N, R52E, Secs. 6-8, 17-20, 29-32; T23N, R51E, Secs. **25,** 35, 36 Mount Diablo Base and Meridian.

Project Mine and Process Area - That portion of the Project Area located within the Project fence, and is described as all or part of Sections 1 and 12 T21N, R51E, Sections 4-9, T21N, R52E, Sections 1, 2, 11-15, 22-25, and 36, T22N, R51E, Section 1, T21.5N, R51.5E, Sections 5, and 6, T21.5N, R52E, Sections 1, 12, 13, 24, 25, and 36, T22N, R51.5E, Sections 6, 7, 18-20, and 29-32, T22N, R52E, and Sections 35, and 36, T23N, R51E.

Propylitic - A type of hydrothermal alteration characterized by the formation of calcite, chlorite, epidote, serpentine, quartz, pyrite, and iron oxides.

Prospect - A place giving indication of a mineral deposit; a mine working or excavation undertaken in a search for ore.

Range - With reference to wild horses and burros, the amount of land necessary to sustain an existing herd or herds of wild free-roaming horses and burros, which does not exceed their known territorial limits.

Recharge - Replenishment of water to an aquifer.

Specific Yield - The quantity of water that a unit volume of an unconfined aquifer after being saturated will yield by gravity, expressed either as a ratio or as a percentage of the volume of the aquifer. Specific yield is a measure of the water available to wells.

Standards for Land Health - Standards are statements of physical and biological condition or degree of function required for healthy sustainable rangelands. Achieving or making significant progress towards these functions and conditions is required of all uses of public lands. Historical data, when available, should be utilized when assessing standards.

Storage Coefficient - The volume of water an aquifer releases from or takes into storage per unit surface area per unit change in head.

Thriving Natural Ecological Balance (TNEB) - Wild horses and burros are managed in a manner that assures significant progress is made toward achieving the Land Health Standards for upland vegetation and riparian plant communities, watershed function, and habitat quality for animal populations, as well as other site-specific or landscape-level objectives, including those necessary to protect and manage threatened, endangered, and sensitive species.

Transmissivity - A measure of the rate of ground water flow through a unit width of an aquifer of a given thickness. It is the product of hydraulic conductivity and the aquifer thickness and can be expressed in terms of square feet per day.

Utilization - The portion of annual forage production that has been consumed by herbivores (wild horses and burros, domestic livestock, wildlife, and insects). The term is also used to refer to the pattern of such use.

Wild Free-Roaming Horses and Burros - All unbranded and unclaimed horses and burros that use public lands within ten contiguous Western States as all or part of their habitat, or that have been removed from these lands by the authorized officer, or have been born of wild horses or burros in authorized BLM facilities, but have not lost their status under the Wild and Free Roaming Horses and Burros Act (16 U.S.C. 1332 (f)).

Xeric - Containing little moisture; very dry.

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